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Article

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Leucothoidae*

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Abstract

Four genera and 17 species of leucothoids, the majority of these belonging to the genus *Leucothoe*, are herein reported from the Great Barrier Reef. Fifteen species are new to science and only *Anamixis bazimut* has been previously reported from the Great Barrier Reef.

Key words: Crustacea, Amphipoda, Leucothoidae, Great Barrier Reef, Australia, taxonomy, new species, *Anamixis bazimut*, *Leucothoe adelphe, Leucothoe bova, Leucothoe epidemos, Leucothoe eumilli, Leucothoe hipposideros, Leucothoe laevipalma, Leucothoe makrommatos, Leucothoe odontiskos, Leucothoe pollexa, Leucothoe rudicula, Leucothoe serrata, Leucothoe sparsa, Leucothoe thula, Leucothoe undulata, Leucothoella gracilis*, *Paranamixis jiigurru*

Introduction

Leucothoids are common gammaridean amphipods in surveys from all marine ecosystems. Including the species described here, the family contains 138 species in six genera: *Anamixis* Stebbing, 1897 (21 species); *Nepanamixis* Thomas, 1997 (4 species); *Paranamixis* Schellenberg, 1938 (13 species); *Leucothoe* Leach, 1814 (96 species); *Leucothoella* Schellenberg, 1928 (2 species); and *Paraleucothoe* Stebbing, 1899 (2 species). Leucothoids are most often found as endocommensals in sessile invertebrates, such as sponges, ascidians, or mantle cavities of bivalve molluscs. They are found less frequently in crevices in coral rubble (Thomas & Klebba 2006, 2007). Eighteen species of Leucothoidae have been reported from Australia in the past, with only three from the Great Barrier Reef (Lowry & Stoddart, 2003). This study increased that number to 33 species from Australia, with 19 from the Great Barrier Reef. Seven of the new species (*Leucothoe hipposideros* **sp. nov.**, *Leucothoe odontiskos* **sp. nov.**, *Leucothoe sparsa* **sp. nov.**, *Leucothoe thula* **sp. nov.**, *Leucothoe laevipalma* **sp nov.**, *Leucothoe undulata* **sp. nov.** and *Leucothoe pollexa* **sp. nov.**) have a uni-articulate maxilla 1 palp, which has not been recorded in any described *Leucothoe* species to date. An "indistinct suture" in the maxilla 1 palp has been reported in *Leucothoe basilobata* Serejo, 1998, *Leucothoe cheiriserra* Serejo, 1998, *Leucothoe urospinosa* Serejo, 1998 *and Leucothoe assimilis* J.L. Barnard, 1974. This character further illustrates the need for taxonomic revision of the Leucothoidae.

 Accepted by A.A. Myers: 15 Jun. 2009; published: 8 Oct. 2009

Materials and methods

The descriptions were generated from the Great Barrier Reef Leucothoidae DELTA database (Dallwitz, 2005). Material examined during this study was hand collected on scuba or snorkel and by washes of rubble, rock and algae samples. A set of colour plates, a list of standard abbreviations and detailed station data are available in Lowry & Myers (2009). The majority of the material examined herein is deposited in the Australian Museum, Sydney, although material of several species is deposited in the Gulf Coast Research Laboratory Museum, Ocean Springs, Mississippi, U.S.A. A CD (*Benthic Amphipoda (Crustacea: Peracarida) of the Great Barrier Reef: Interactive Keys*) is available with the book or the keys can be accessed at the crustacea.net website. The coxa width measurements herein are taken as the width of the coxa parallel to the body axis and listed as ratios of coxa 1. Lower case letters to the right of capital letters in the figures refer to the following adjectives; l = lateral, m = medial, + = magnified.

Leucothoidae Dana, 1852

Anamixis Stebbing, 1897

Anamixis bazimut Thomas, 1997
(Figs 1, 2)

Anamixis bazimut Thomas, 1997: 45–47, fig. 2. —Lowry & Stoddart, 2003: 154 (catalogue).

Material examined. 1 male, AM P70802 (QLD1649); 1 male, AM P70977 (QLD 1684); 2 males, AM P71542 (QLD 1823); 3 males, AM P71505 (QLD 1823); 1 male, GCRL2882 (SEL/LZI-2-1); 1 male, GCRL2883 (SEL/LZI-2-3); 1 male, AM P79867 (SEL/LZI-2-7).

Type locality. Tab Anchorage, Madang, Papua New Guinea (05°10.3'S 145°50.6'E).

Description. Based on male, 2.8 mm, AM P79867.

Head. *Head* length less than pereonite 1+2, anterior margin transverse, without serrations or teeth, anterodistal margin quadrate with cusp, ventral cephalic keel subquadrate, rostrum large; eyes round, with 10 or more scattered ocelli. *Antenna 1* 0.3 x body length; flagellum 8-articulate, peduncle width less than 2 x article 2. *Antenna 2* 0.3 x body length, shorter than antenna 1; flagellum 2-articulate. *Maxilliped* inner plates fused, reduced, distal margin with small cleft, bare; outer plate smooth, reduced, not extending past base of palp article 1, bare; palp 4-articulate, article 4 elongate, extremely slender, strongly recurved.

Pereon. *Coxae 1–4* relative widths 1.0:2.8:3.2:3.1. *Gnathopod 1* coxa smooth, bare, anterodistal corner not produced, truncate, distal margin with v-shaped projection, posterodistal margin quadrate, facial setae absent; basis constricted proximally, anterior and posterior margins bare; ischium bare; carpus and propodus narrow; carpus length 16 x width, distal margin bare; propodus evenly curved, posterior margin tuberculate, palm dentate with 12 distal setae, geniculate; dactylus absent. *Gnathopod* 2 coxa length 2 x width, slightly narrower than coxa 3, anterior margin smooth, anterodistally subquadrate; distal margin produced, posterior margin straight, facial setae absent; basis widened distally, without tubercles or serrations, anterior margin with 4 setae, posterior margin bare; ischium with 2 anterodistal setae; carpus subequal in length to propodus, straight, distally tapered, anterior margin smooth, anterodistal margin with indentation; propodus posterior margin without teeth/serrations, with 1 mediofacial setal row above midline, reaching 0.2 x propodus length, 1 row of 5–7 submarginal setae, palm linear with 1 major projection; dactylus slightly recurved with paired setae on posterior margin, anterior margin distally subacute, reaching 0.5 x propodus length. *Pereopod* 3 coxa length 1.3 x width; anterodistal corner over-riding distal face of coxa 2, not extending below it; distal margin straight with posterior cusp, bare, posterior margin straight, facial setae absent. *Pereopod 4* coxa anterior margin slightly concave, distal margin rounded with posterior cusp, posterior margin straight, facial setae absent. *Pereopods 5–7* coxa facial setae absent; basis width length ratios 1:1.3, 1:1.5, 1:1.5. *Pereopods 5–6* posterior margins smooth, bare. *Pereopod 7* basis posterior margin smooth, setose.

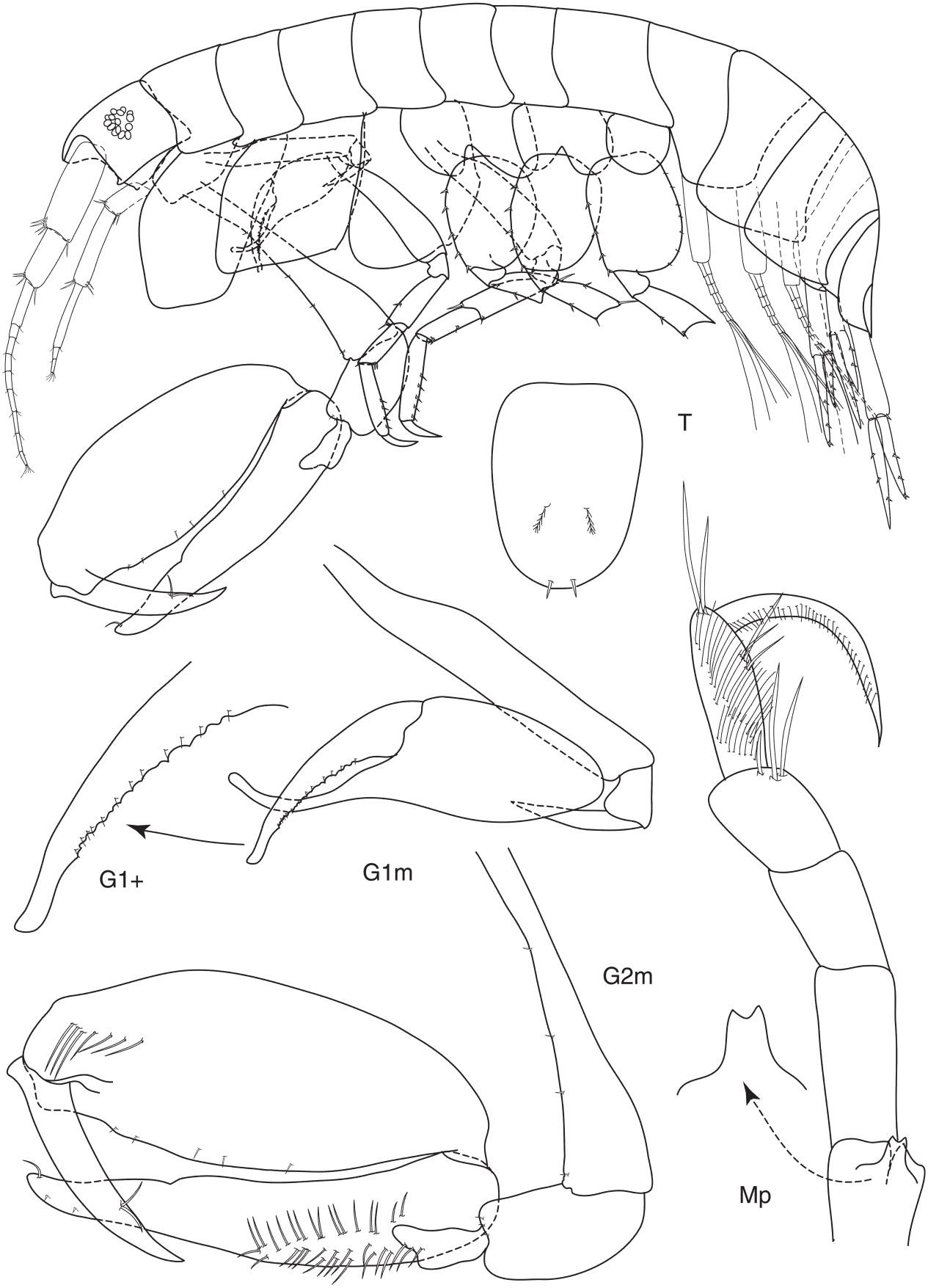

FIGURE 1. *Anamixis bazimut* Thomas, 1997, male, 2.8 mm, AM P79867 (SEL/LZI-2-7), Picnic Beach, Palfrey Island, Great Barrier Reef.

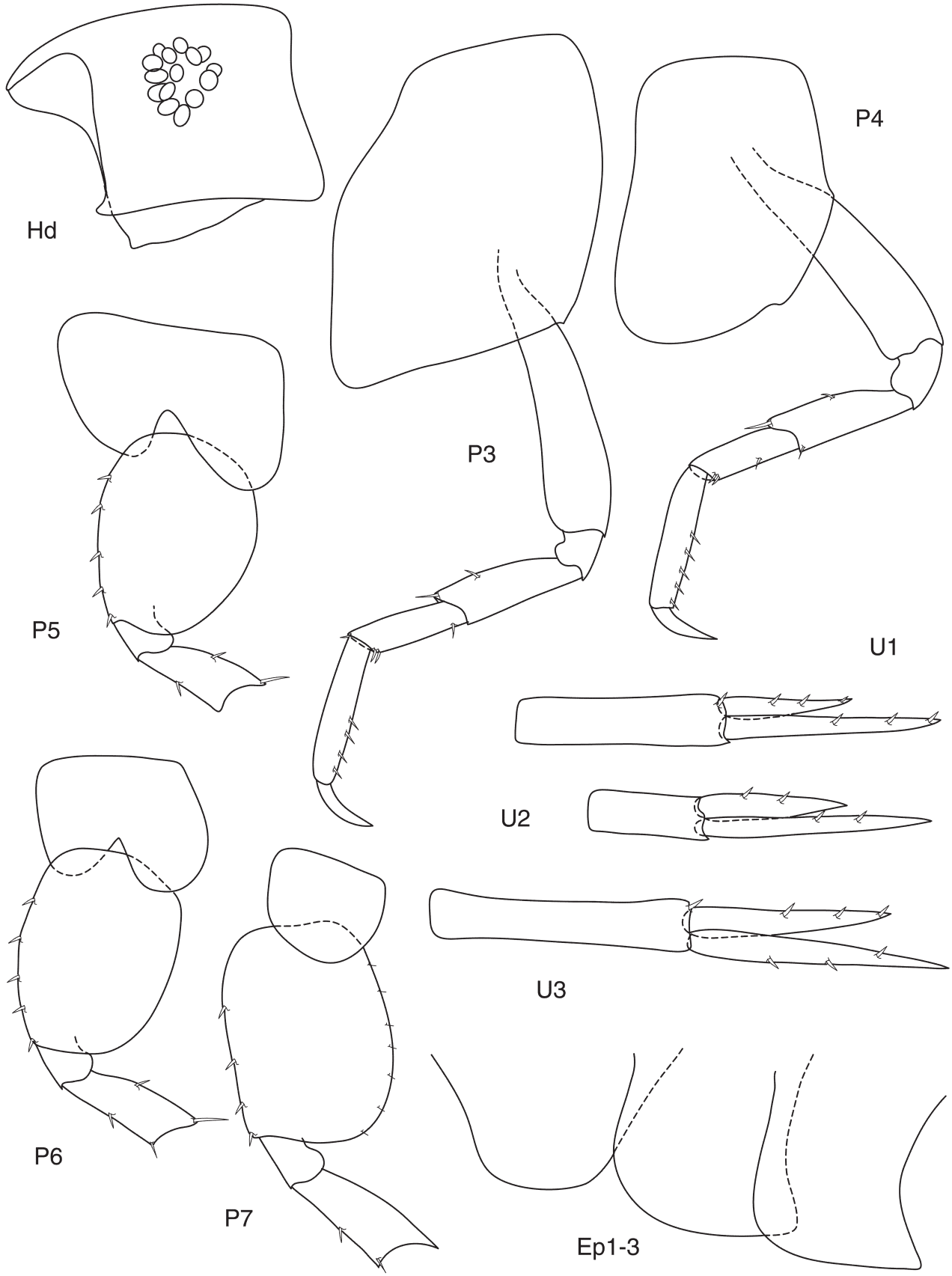

FIGURE 2. *Anamixis bazimut* Thomas, 1997, male, 2.8 mm, AM P79867 (SEL/LZI-2-7), Picnic Beach, Palfrey Island, Great Barrier Reef.

Pleon. *Epimera 1–3* bare. *Epimeron 3* posteroventral corner produced. *Uropods 1–3* relative lengths 1.0:0.8:1.1; inner and outer ramus with robust setae. *Uropod 1+3* peduncle subequal to inner ramus length. *Uropod 2* peduncle 0.5 x inner ramus length. *Uropods 1–2* outer ramus 0.6 x inner ramus length. *Uropod 3* outer ramus 0.8 x inner ramus length. Telson 1.4 x longer than wide, with 2 plumose dorsofacial setae, apex rounded.

Female (sexually dimorphic characters). Leucomorphs unknown.

Habitat. In sponges and a species of *Halimeda* Lamouroux, 1812, from coral rubble and sandy bottom on a patch reef in the channel between outer reefs. Thomas (1997) reported the Papua New Guinea specimens from small asconoid sponges in rubble areas.

Remarks. *Anamixis bazimut* is distinct from all other species in the following characters: transverse anterior head margin, subquadrate distal keel projecting below the head, gnathopod 3 coxa slightly shorter than gnathopod 2 and pereopod 4 coxa and its produced coax 2 distal margin. This species is similar to *Anamixis kateluensis* and *Anamixis moana* Thomas, 1997 in its subequal coxa 2–4, broad ventral cephalic keel and its general shape and morphology of gnathopod 2. *Anamixis bazimut* and *A. kateluensis* both have apical processes on the inner plates of the maxilliped, whereas *A. moana* has truncate inner plates.

Distribution. *Australia*. Queensland: Lizard Island to Orpheus Island (current study); Great Barrier Reef (Lowry & Stoddart 2003). *Papua New Guinea*: Bismarck Sea, Madang Lagoon (Thomas 1997).

Leucothoe Leach, 1814

Leucothoe adelphe sp. nov.
(Figs 3, 4)

Type material. Holotype, male, 1.6 mm, AM P71436, Three Sisters Bommie, Yonge Reef (14°36.104'S 145°37.126'E), coral rubble, back reef bommie, 17 m, C. Rakocinski, 3 March 2005 (QLD 1792). Paratype, female, 1.9 mm, AM P71271, Horseshoe Reef, Lizard Island (14°41.21'S 145°26.49'E), clump of fibrous brown algae, large coral bommies surrounded by sand and rubble, 6 m, L. Hughes, 2 March 2005 (QLD 1767).

Additional material examined. 3 males, AM P79819 (JDT/LIZ 15).

Type locality. Yonge Reef, Lizard Island, Queensland, Australia (14°36.104'S 145°37.126'E).

Etymology. After the Greek '*adelphe*', meaning 'sister' and referring to the type locality.

Description. Based on holotype, male, 1.6 mm, AM P71436.

Head. *Head* length less than pereonite 1+2, anterior margin weakly convex, without serrations or spines, anterodistal margin rounded with cusp, ventral cephalic keel transverse, rostrum small to medium; eyes with 10 or more ocelli, round. *Antenna 1* 0.3 x body length; flagellum 5-articulate, peduncle width less than 2 x article 2. *Antenna 2* 0.3 x body length, subequal to antenna 1; flagellum 5-articulate. *Mandibles* left mandible missing; right mandible lacking molar; incisor strongly dentate; lacinia mobilis small, with 7 accessory setae; palp 3-articulate, ratio of articles 1–3, 1.0:2.2:1.1, article 2 with 1 distal seta, article 3 with 2 distal setae. *Upper* and *lower lips* and *maxillae 1–2* missing. *Maxilliped* inner plates fused, distal margin notched, with short spines; outer plate smooth, reduced, reaching much less than half of palp article 1, with 3 proximal and 2 facial setae; palp 4-articulate, article 4 wide, slightly recurved.

Pereon. *Coxae 1–4* relative widths 1.0:0.9:1.1:1.4. *Gnathopod 1* coxa smooth, bare, anterodistal corner produced, narrowly rounded, distal margin straight, posterodistal angle subquadrate, facial setae absent; basis slightly inflated, anterior and posterior margins bare; ischium bare; carpus and propodus distally tapered; carpus length 9 x width, proximal margin with 2 dentitions, distal margin with 4 setae; propodus straight, palm dentate with 5 distal setae; dactylus smooth, reaching 0.1 x propodus length. *Gnathopod 2* coxa length subequal to width, slightly narrower than coxa 3, anterior margin smooth, anterodistally rounded, distal margin evenly rounded, posterior margin straight, facial setae absent; basis stout, widened distally, without tubercles or serrations, anterior and posterior margins bare; ischium bare; carpus 0.3 x propodus length, gently

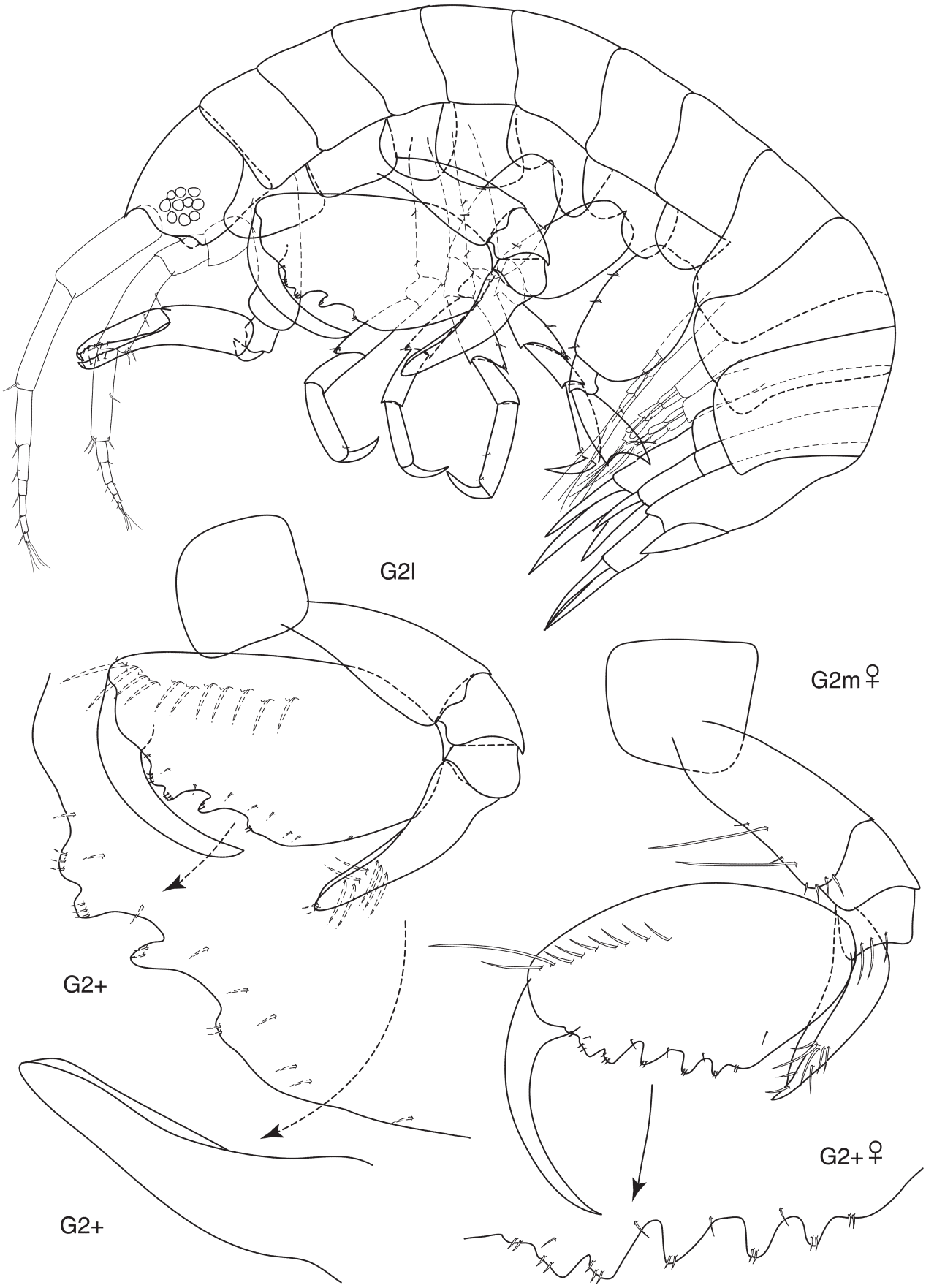

FIGURE 3. *Leucothoe adelphe* **sp. nov.**, holotype, male, 1.6 mm, AM P71436 (QLD 1792), Three Sisters Bommie, Yonge Reef, Great Barrier Reef; paratype, female, 1.9 mm, AM P71271 (QLD 1767), Horseshoe Reef, Lizard Island, Great Barrier Reef.

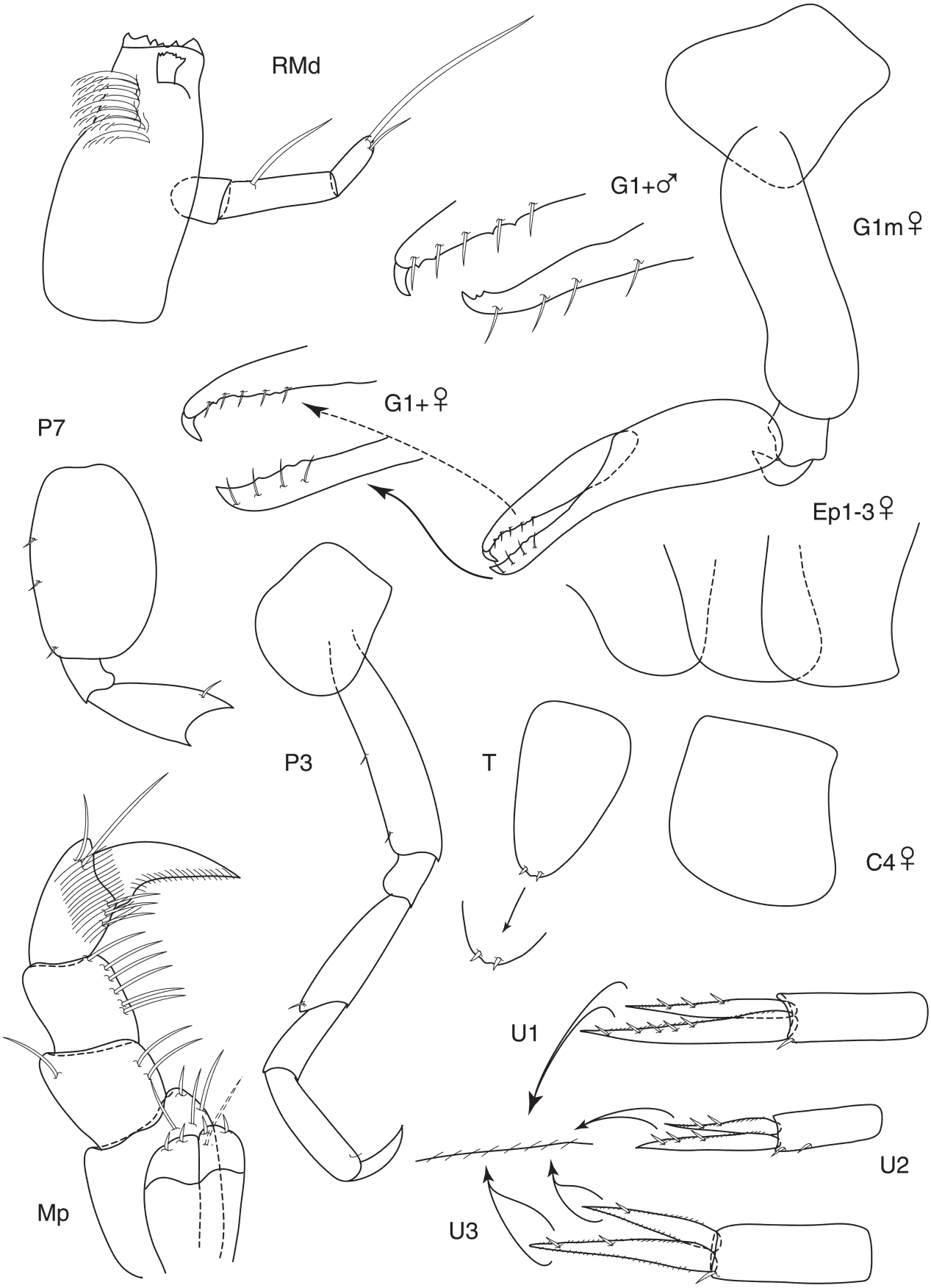

FIGURE 4. *Leucothoe adelphe* **sp. nov.**, holotype, male, 1.6 mm, AM P71436 (QLD 1792), Three Sisters Bommie, Yonge Reef, Great Barrier Reef; paratype, female, 1.9 mm, AM P71271 (QLD 1767), Horseshoe Reef, Lizard Island, Great Barrier Reef.

curved, distally truncate, anterior margin smooth; propodus posterior margin without spines/serrations, with 1 mediofacial setal row above midline, reaching approximately 0.5 x propodus length, 1 row of 8 submarginal setae, palm convex with 4 blunt projections; dactylus recurved, proximal margin smooth, anterior margin distally subacute, reaching 0.7 x propodus length. *Pereopod 3* coxa length subequal to width; smooth, bare, anterodistal corner over-riding distal face of coxa 2 and extending below it, anterior margin evenly rounded, distal margin oblique, posterior margin evenly rounded, facial setae absent. *Pereopod 4* coxa smooth, bare, anterior margin evenly rounded, distal margin evenly rounded, posterior margin mildly excavate, facial setae absent. *Pereopods 5–7* coxa facial setae absent; basis width length ratios 1:1.7, 1:1.9, 1:1.5, posterior margins smooth, bare.

Pleon. *Epimera 1–3* bare. *Epimeron 3* posteroventral margin subquadrate. *Uropods 1–3* relative lengths 1.0:0.7:1.0; outer ramus 0.8 x inner ramus length. *Uropod 1* peduncle 0.7 x inner ramus length. *Uropod 2* peduncle 0.8 x inner ramus length. *Uropod 1–2* inner ramus proximal margin lined with short setae, with robust setae; outer ramus distal margin lined with short setae, with robust setae. *Uropod 3* peduncle and inner ramus subequal in length; inner and outer ramus proximal and distal margins lined with short setae; inner ramus with robust setae, outer ramus with 1 robust seta. *Telson* 1.7 x longer than wide, apex with weak point.

Female (sexually dimorphic characters). Based on paratype, female, 1.9 mm, AM P71271. *Gnathopod 1* carpus proximal margin without strong dentitions, weakly dentate anterodistally; propodus palm with fewer dentitions. *Gnathopod 2* basis anterior margin with 2 long and 2 short setae, anterodistal margin with row of 4 short setae; propodus mediofacial setal row with fewer setae; submarginal setal row with 5 setae; dactylus distally acute.

Habitat. In coral rubble and fibrous brown algae from back reef bommies.

Remarks. This species appears to be closely related to *Leucothoe micronesiae* J.L. Barnard, 1965 and *Leucothoe minuscula* Schellenberg, 1938 based on the small size, short mediofacial setal row and strong dentition of the gnathopod 2 propodus palm. J.L. Barnard (1965) noted that the only difference between *L. micronesiae* and *L. minuscula* was the size and development of the female gnathopod 2. Closer examination suggests that these species may need to be synonymised. *Leucothoe adelphe* **sp. nov.** differs from *L. micronesiae* and *L. minuscula* in its narrow, smooth basis of pereopods 5–7, its rounded propodus on gnathopod 2 and its shorter, less recurved propodus of gnathopod 1. The strong dentition of the gnathopod 2 propodus palm is shared with *Leucothoe ashleyae* Thomas & Klebba, 2006, *Leucothoe hornelli* Walker, 1904, *Leucothoe stegoceras* Walker, 1904, *Leucothoe rudicula* **sp. nov.** and *Leucothoe serrata* **sp. nov.**, but differs in most other respects, namely the short gnathopod 1 dactylus. These species share the general shape of gnathopod 1 with species in the genus *Paraleucothoe*; however, the propodus of *L. adelphe* **sp. nov.** is much narrower than in *Paraleucothoe*.

Distribution. *Australia*. Queensland: Yonge Reef and Horseshoe Reef, Lizard Island (current study).

***Leucothoe bova* sp. nov.**
(Figs 5, 6)

Type material. Holotype, male, 6.0 mm, AM P80175, Pioneer Bay (~18°36'S 146°29'E), *Haliclona* sp. sponge, 5 m, K.N. Klebba, 24 May 2004 (JDT/OPH 24). Paratype, female, 5.4 mm, AM P80176, same station data.

Type locality. Pioneer Bay, Orpheus Island, Queensland, Australia (~18°36’S 146°28’E).

Etymology. After the Latin ‘*bova*’, meaning ‘swelling of the legs’ and referring to the expanded gnathopod 1 basis in both males and females.

Description. Based on holotype, male, 6.0 mm, AM P80175.

Head. *Head* length less than pereonite 1+2, anterior margin rounded, without serrations or teeth, anterodistal margin rounded without cusp, ventral cephalic keel rounded, rostrum small to medium; eyes with 10 or more ocelli, round. *Antenna 1* 0.2 x body length; flagellum 6-articulate, peduncle width less than 2 x

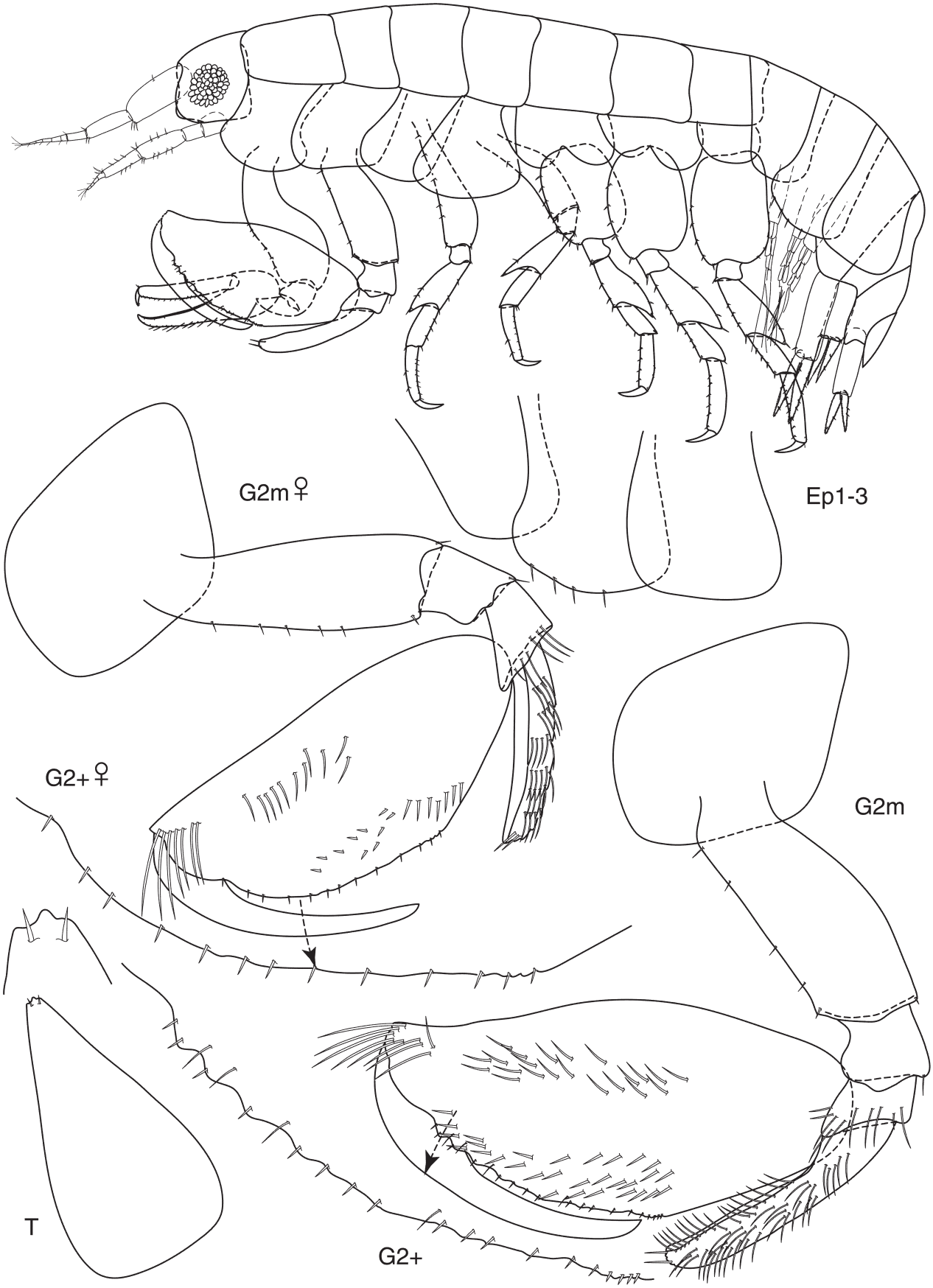

FIGURE 5. *Leucothoe bova* **sp. nov.**, holotype, male, 6.0 mm, AM P80175; paratype, female, 5.40 mm, AM P80176 (JDT/OPH-24), Pioneer Bay, Orpheus Island, Great Barrier Reef.

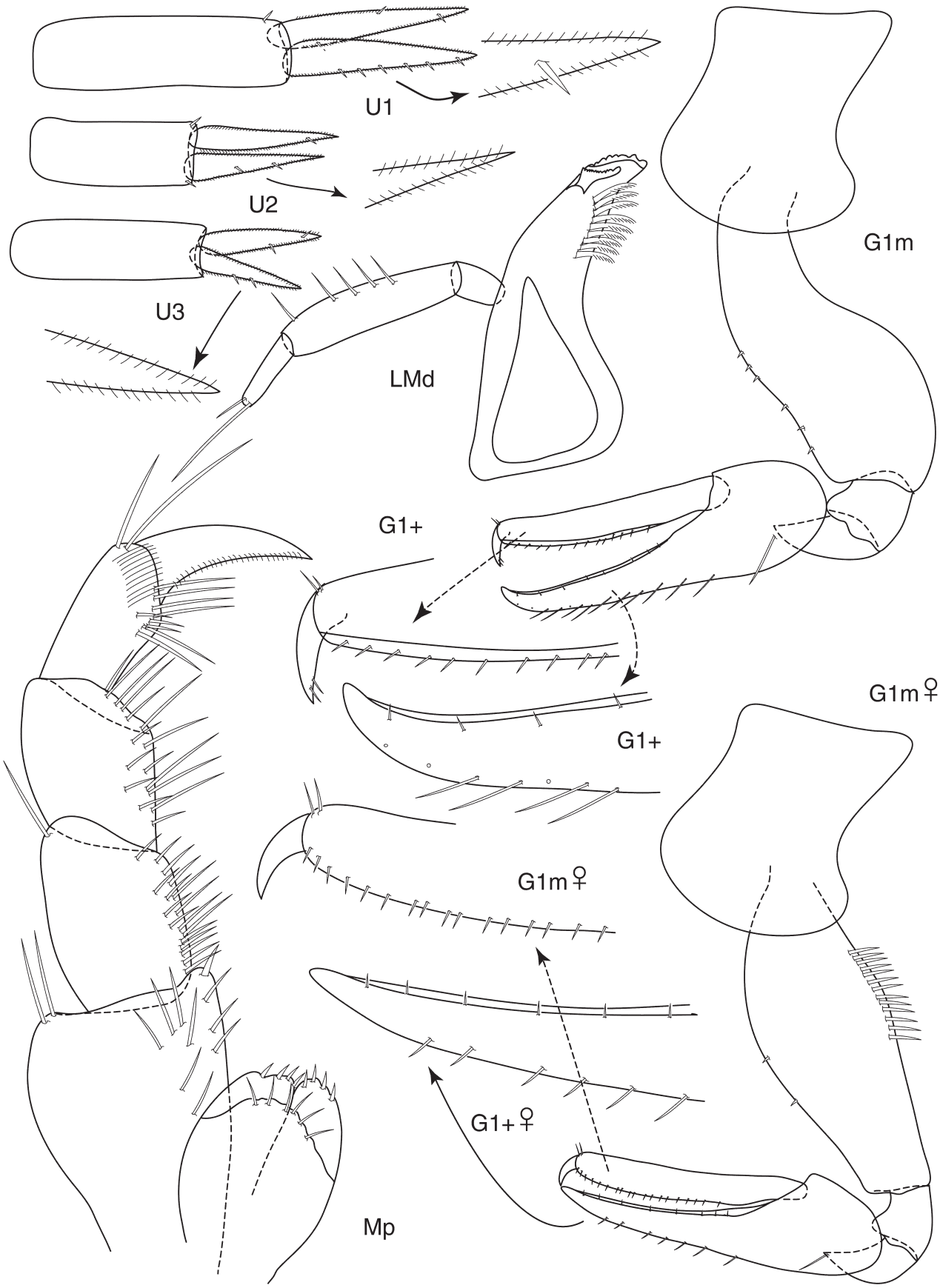

FIGURE 6. *Leucothoe bova* **sp. nov.**, holotype, male, 6.0 mm, AM P80175; paratype, female, 5.40 mm, AM P80176 (JDT/OPH-24), Pioneer Bay, Orpheus Island, Great Barrier Reef.

article 2. *Antenna 2* 0.2 x body length, shorter than antenna 1; flagellum 4-articulate. *Mandibles* lacking molars; palp 3-articulate, ratio of articles 1–3, 1.0:2.4:0.7, article 2 with 5–6 distal setae, article 3 with 2 distal setae; incisors strongly dentate; left mandible lacinia mobilis large, strongly toothed, with 9 accessory setae, right mandible lacinia mobilis small, with 9 accessory setae. *Upper lip* asymmetrically lobate, anterior margin setose. *Lower lip* inner lobes fused, strongly setose; outer lobes with moderate gape, anterior margins continually setose. *Maxilla 1* palp 2-articulate with 4 distal setae; outer plate with 8 distal spines and 5 distal setae. *Maxilla 2* inner plate with 6 robust distal setae; outer plate with 3 robust and 10 thin distal setae. *Maxilliped* inner plates fused, distal margin with v-shaped indentation, with short spines and setae; outer plate smooth, reduced, reaching much less than half of palp article 1, with 10 distal setae and 1 distal spine; palp 4-articulate, article 4 wide, slightly recurved.

Pereon. *Coxae 1–4* relative widths 1.0:1.1:0.9:1.1. *Gnathopod 1* coxa smooth, bare, anterodistal corner produced, broadly rounded, distal margin rounded, posterior margin excavate, facial setae absent; basis widened anteroproximally and posterodistally, anterior margin with 6 spine-setae, posterior margin bare; ischium bare; carpus and propodus narrow, distally attenuated; carpus length 6.6 x width, proximal margin smooth, distal margin setose; propodus straight, palm smooth with 14 distal setae; dactylus smooth with 2 proximal setae, reaching 0.2 x propodus length. *Gnathopod 2* coxa length 0.7 x width, slightly wider than coxa 3, smooth, bare, anterodistally rounded, distal margin evenly rounded, posterior margin straight, facial setae absent; basis constricted proximally, without tubercles or serrations, anterior margin with 5 short setae, posterior margin bare; ischium with 1 posterodistal seta; carpus 0.3 x propodus length, straight, distally tapered, anterior margin serrate; propodus posterior margin without spines/serrations, with 2 mediofacial setal rows, primary mediofacial setal row clustered below midline, reaching 0.6 x propodus length, secondary mediofacial setal row with cluster of 8 setae, cluster of 21 submarginal setae, palm convex with 4 minor projections; dactylus curved, proximal margin smooth, anterior margin distally subacute, reaching 0.6 x propodus length. *Pereopod 3* coxa length subequal to width; anterodistal corner over-riding distal face of coxa 2 and extending below it, smooth, bare, anterior margin produced anterodistally, distal margin straight, posterior margin straight, facial setae absent. *Pereopod 4* coxa smooth, bare, anterior margin evenly rounded, distal margin evenly rounded, posterior margin straight, facial setae absent. *Pereopods 5–7* coxa facial setae absent; basis width length ratios 1:1.3, 1:1.4, 1:1.4. *Pereopods 5*–6 basis posterior margins smooth, bare. *Pereopod 7* posterior margin smooth, setose.

Pleon. *Epimera 1+3* bare. *Epimeron 2* with 4 ventral setae. *Epimeron 3* posteroventral margin broadly rounded. *Uropods 1–3* relative lengths 1.0:0.7:0.7. *Uropod 1* peduncle 1.3 x inner ramus length; outer and inner ramus subequal in length. *Uropod 2* peduncle subequal in length with inner ramus; inner ramus with robust setae, outer ramus with 1 robust seta. *Uropod 3* peduncle 1.6 x inner ramus length. *Uropods 2–3* outer ramus subequal to inner ramus length. *Uropod 1+3* inner and outer ramus lined with short marginal setae, with robust setae. *Telson* 1.8 x longer than wide, apex tridentate.

Female (sexually dimorphic characters). Based on paratype, female, 5.4 mm, AM P80176. *Gnathopod 1* basis widened proximally, posterior margin with 13 setae; carpus with shorter distal setae. *Gnathopod 2* propodus mediofacial and submarginal setal rows with fewer setae, palm with less prominent projections; carpus distal margin undulating; dactylus anterior margin distally obtuse.

Habitat. In a species of the encrusting sponge *Haliclona* Grant, 1836, on patch reefs.

Remarks. *Leucothoe bova* **sp. nov.** is distinct in its short antennae, large eyes, widened mandibular palp article 2, expanded gnathopod 1 basis, long distal setae on gnathopod 1 carpus and extensive submarginal setae on gnathopod 2 propodus. The posterior setae on gnathopod 1 basis is shared with females of *Leucothoe saron* Thomas & Klebba, 2007, *Leucothoe ubouhu* Thomas & Klebba, 2007 and *Leucothoe undulata* **sp. nov.** The distal setae on gnathopod 1 carpus is similar to *Leucothoe flammosa* Thomas & Klebba, 2007, which inhabits bivalve molluscs. *Leucothoe bova* is similar to *L. ashleyae,* females of *L. assimilis, Leucothoella banwarthii* Schellenberg, 1928, *Leucothoe barana* Thomas & Klebba, 2007*, Leucothoe kensleyi* Thomas & Klebba, 2006, *L. ubouhu, L laevipalma* **sp. nov.***, L. makrommatos* **sp. nov.***, L. odontiskos* **sp. nov**. and *L. undulata* in its gnathopod 2 propodus secondary mediofacial setal row.

Distribution. *Australia*. Queensland: Orpheus Island (current study).

***Leucothoe epidemos* sp. nov.**
(Figs 7, 8, Pl. 3H)

Type material. Holotype, male, 14.6 mm, AM P70663; Watsons Bay, Lizard Island (14°39.41'S 145°27.14°E), tunicate *Styela* sp., patch reef, 5 m, J.K. Lowry, 24 February 2005 (QLD 1638). Paratype, female, 12.7 mm, AM P71221; Casuarina Beach, Lizard Island (14°40.38'S 145°26.69'E), 11 tunicates from rock & rubble, sandy bottom with rubble, algae & sparse seagrass, 2 m, S. LeCroy, 2 March 2005 (QLD 1770).

Additional material examined. 1 male, AM P70631 (QLD 1621); 2 females, AM P70589 (QLD 1622); 1 female AM P70647 (QLD 1634); 1 female, AM P70662 (QLD 1638); 4 females, AM P70736 (QLD 1643); 1 male, AM P70754 (QLD 1645); 1 female, AM P70761 (QLD 1652); 1 male, AM P70764 (QLD 1659); 4 females, AM P70918 (QLD 1681); 3 females, 2 juveniles, AM P70970 (QLD 1687); 1 female, AM P70885 (QLD 1692); 1 female, AM P17028 (QLD 1713); 1 juvenile, AM P71175 (QLD 1723); 1 female, AM P71184 (QLD 1730); 2 females, AM P71100 (QLD 1733); 1 juvenile, AM P71168 (QLD 1751); 1 female, AM P71260 (QLD 1757); 1 female, AM P71230 (QLD 1760); 3 females, 1 male, AM P71281 (QLD 1770); 4 females, AM P71377 (QLD 1788); 4 females, 1 male, AM P71354 (QLD 1789); 1 male, AM P71380 (QLD 1791); 1 juvenile, AM P71372 (QLD 1798); 1 female, AM P71358 (QLD 1803); 1 male, AM P71427 (QLD 1808); 1 male, AM P71416 (QLD 1816); 1 female, AM P71492 (QLD 1819); 1 female, AM P71441 (QLD 1820); 1 female, 2 juveniles, AM P71562 (QLD 1823); 1 female, 3 juveniles, AM P71532 (QLD 1823); 1 female, 1 male, AM P71564 (QLD 1823); 2 females, AM P71579 (QLD 1829); 1 female, 1 male, AM P71522 (QLD 1829); 1 male, 4 females, GCRL2887 (SEL/LZI-2-1); 1 male, 1 female, GCRL2885 (SEL/LZI-2-3); 1 male, 1 juvenile, GCRL2884 (SEL/LZI-3-2); 2 females, GCRL2886 (SEL/LZI-2-7); 2 females, GCRL2888 (SEL/LZI-4-1).

Type locality. Watsons Bay, Lizard Island, Queensland, Australia (14°39.41'S 145°27.14°E).

Etymology. After the Greek '*epidemos*', meaning '*prevalent, common to a large number*' and referring to the high numbers of this species collected at Lizard Island, Australia.

Description. Based on holotype, male, 14.6 mm, AM P70663.

Head. *Head* length less than pereonite 1+2, anterior margin rounded, anterodistal margin rounded without cusp, ventral cephalic keel rounded, rostrum small to medium; eyes with 10 or more ocelli, posteriorly concave. *Antenna 1* 0.3 x body length; flagellum 8-articulate, peduncle width less than 2 x article 2. *Antenna 2* 0.3 x body length, shorter than antenna 1; flagellum 3-articulate. *Mandibles* lacking molars; palp 3-articulate, ratio of articles 1-3, 1.0:4.2:2.5, article 2 with 17–18 distal setae, article 3 with 2 distal setae, incisors strongly dentate; left mandible lacinia mobilis large, strongly toothed, with 12 accessory setae, right mandible lacinia mobilis small, with 7 accessory setae. *Upper lip* asymmetrically lobate, anterior margin setose. *Lower lip* inner lobes fused, bare; outer lobes with moderate gape, anterior margins weakly setose. *Maxilla 1* palp 2-articulate with 4 distal setae; outer plate with 7 distal spines and 4 proximal setae. *Maxilla 2* inner plate with 5 distal and 3 proximal setae; outer plate with 3 robust and 20 thin distal setae. *Maxilliped* inner plates fused, apical margin with v-shaped indentation, with short spines, long setae and a dense coating of facial setae; outer plate smooth, reduced, reaching half of palp article 1, with 3 proximal and 3 distal setae and 1 distal spine; palp 4-articulate, article 4 slender, slightly recurved.

Pereon. *Coxae 1–4* relative widths 1.0:1.1:0.8:1.4. *Gnathopod 1* coxa smooth, bare, anterodistal corner produced, truncate, distal margin straight, posterodistal margin subquadrate, with 1 facial seta; basis slightly constricted proximally, anterior margin with 12 setae, posterior margin bare; ischium bare; carpus and propodus distally tapered; carpus length 8.9 x width, proximal margin with 3 serrate rows, distal margin setose; propodus straight, palm serrate with 6 proximal setae; dactylus smooth, reaching 0.4 x propodus

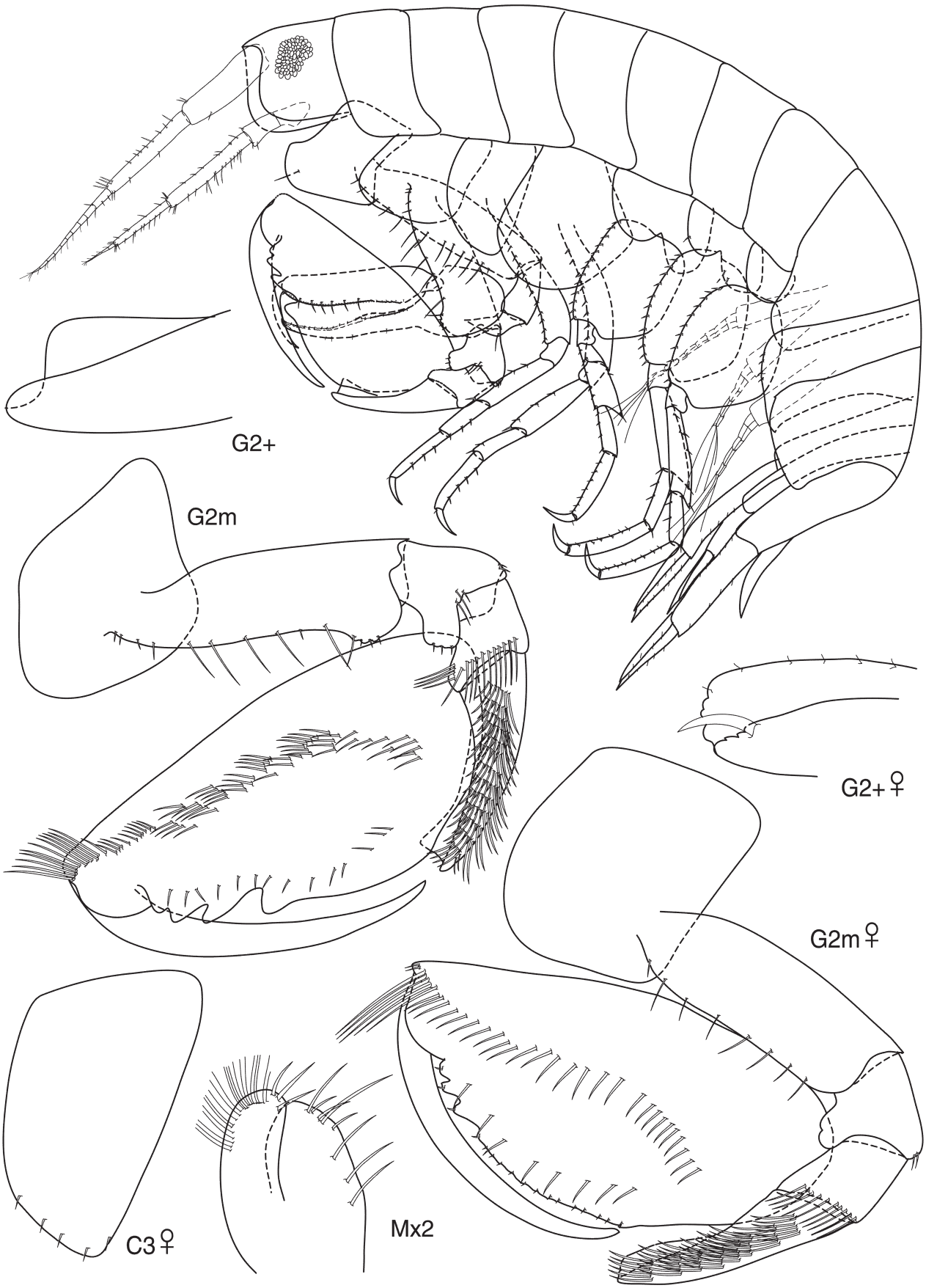

FIGURE 7. *Leucothoe epidemos* **sp. nov.**, holotype, male, 14.6 mm, AM P70663 (QLD 1638), Watsons Bay, Lizard Island, Great Barrier Reef; paratype, female, 12.7 mm, AM P71221 (QLD 1770), Casuarina Beach, Lizard Island, Great Barrier Reef.

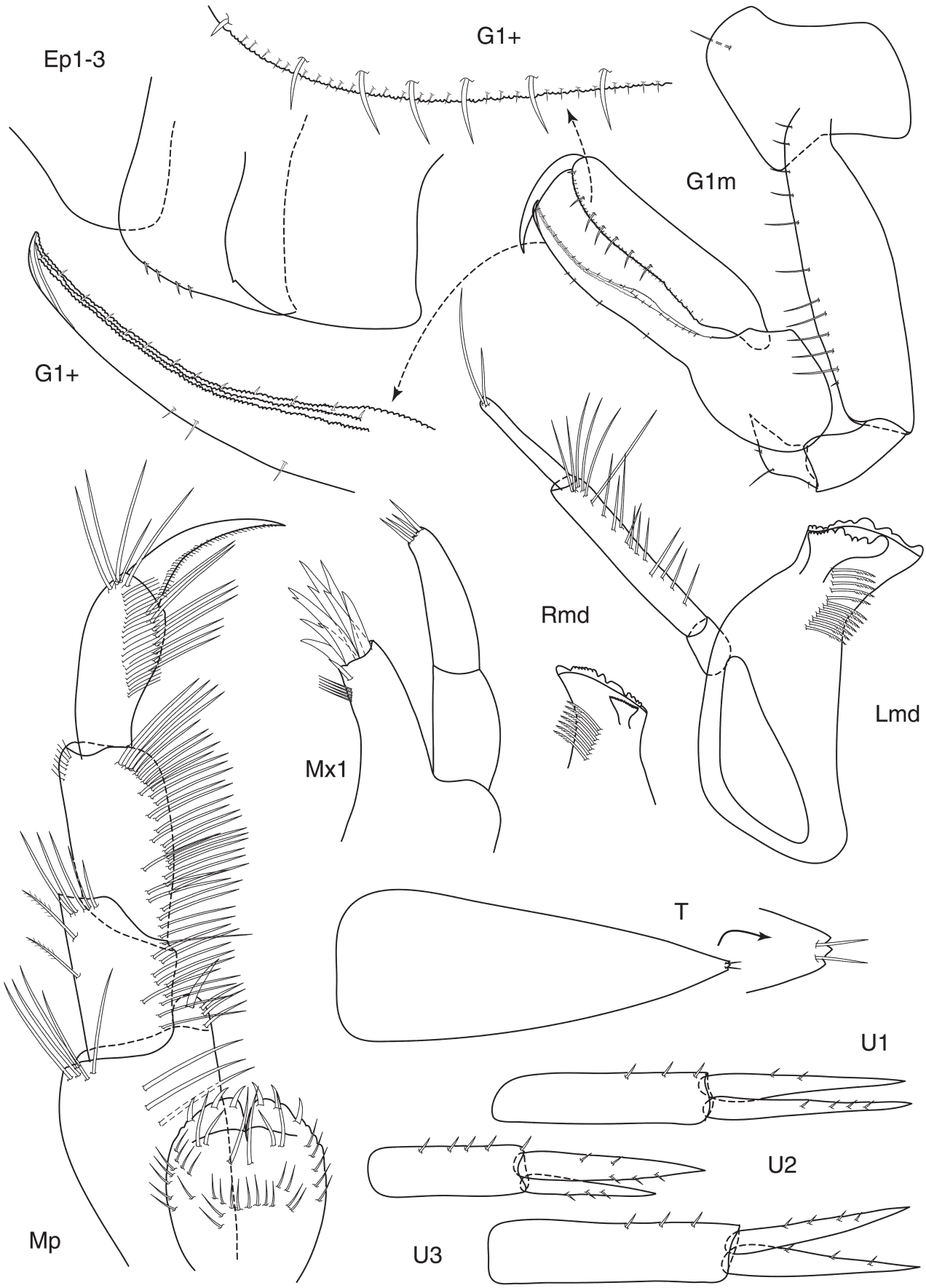

FIGURE 8. *Leucothoe epidemos* **sp. nov.**, holotype, male, 14.6 mm, AM P70663 (QLD 1638), Watsons Bay, Lizard Island, Great Barrier Reef.

length. *Gnathopod 2* coxa length subequal to width, slightly wider than coxa 3, smooth, bare, anterodistally rounded, distal margin evenly rounded, posterior margin slightly concave, facial setae absent; basis widened anterodistally, with 3 distal tubercles, anterior margin with 12–14 setae, posterior margin bare; ischium with 3 anterodistal, 3 distal and 2 posterodistal setae; carpus 0.3 x propodus length, curved, distally truncate, spoon-like, anterior margin smooth; propodus posterior margin without spines/serrations, with 1 mediofacial setal row displaced to midline, reaching 0.8 x propodus length, 1 row of 14 submarginal setae, palm convex with 4 major projections; dactylus curved, proximal margin smooth, anterior margin distally subacute, reaching 0.7 x propodus length. *Pereopod 3* coxa length 1.5 x width, smooth, bare, anterodistal corner over-riding distal face of coxa 2, not extending below it, anterior margin evenly rounded, distal margin oblique, posterior margin straight, facial setae absent. *Pereopod 4* coxa smooth, bare, anterior and distal margins evenly rounded, posterior margin excavate, facial setae absent. *Pereopods 5–7* coxa facial setae absent; basis width length ratio 1:1.2, 1:1.2, 1:1.2, posterior margins smooth, bare.

Pleon. *Epimera 1+3* bare. *Epimeron 2* with 4 ventral setae. *Epimeron 3* posteroventral margin weakly produced. *Uropods 1–3* relative lengths 1.0:0.8:1.0; inner and outer ramus with robust setae. *Uropod 1* peduncle subequal in length with inner ramus. *Uropod 2* peduncle 0.8 x inner ramus length; outer ramus 0.7 x inner ramus length. *Uropod 3* peduncle 1.3 x inner ramus length. *Uropod 1+3* outer ramus subequal to inner ramus length. *Telson* 2.6 x longer than wide, apex tridentate.

Female (sexually dimorphic characters). Based on paratype, female, 12.7 mm, AM P71221. *Gnathopod 2* carpus not spoon-like, anterior margin serrate; propodus mediofacial setal row less setose; submarginal setal row with 8 setae. *Pereopod 3* coxa with marginal setae.

Habitat. Inside branchial chamber of ascidians *Polycarpa aurata* (Quoy & Gaimard, 1834), *Atriolum robustum* Kott, 1983 and *Styela* Fleming, 1822 sp., in algae, coral rubble and the sponge *Spirastrella vagabunda* (Ridley, 1884).

Remarks. *Leucothoe epidemos* **sp. nov.** shares the spoon-like gnathopod 2 carpus with *Leucothoe alata* J.L. Barnard, 1959, *Leucothoe lihue* J.L. Barnard, 1970a, *Leucothoe spinulosa* Chevreux, 1927, *Leucothoe tridens* Stebbing 1888 and *L. rudicula* **sp. nov.** The profusely displaced mediofacial setal row is found in *Leucothoe commensalis* Haswell 1879, *Leucothoe wuriti* Thomas & Klebba, 2007 and *Leucothoe thula* **sp. nov.** *Leucothoe epidemos* **sp. nov.** differs from *L. commensalis* in its single mediofacial setal row, rounded ventral cephalic keel and wider pereopods 5–7 basis. *Leucothoe epidemos*, *L. wuriti*, *Leucothoe pollexa* **sp. nov.** and *L. thula* share the facial seta on coxa 1. This species may be a sister taxon to *L. commensalis*, which has been reported frequently from this region, with each description showing slight variations. It is likely that *L. commensalis* is a cryptic species complex due to its isolated lifestyle in ascidian hosts.

Distribution. *Australia*. Queensland: Lizard Island (current study).

***Leucothoe eumilli* sp. nov.**
(Figs 9, 10)

Type material. Holotype, male, 2.2 mm, AM P80177, Fantome Island (~18°39'S 146°30'E), pink ball sponge, 3 m, K.N. Klebba, 23 May 2004 (JDT/OPH 23).

Type locality. Fantome Island, Queensland, Australia (~18°39'S 146°30'E).

Etymology. After the native Manbarra Aboriginal word, '*Eumilli*', meaning 'Fantome Island' and referring to the type locality.

Description. Based on holotype, male, 2.2 mm, AM P80177.

Head. *Head* length less than pereonite 1+2, anterior margin with cusp, without serrations or teeth, anterodistal margin rounded, ventral cephalic keel subquadrate, rostrum small to medium; eyes with 10 or more ocelli, round. *Antenna 1* 0.3 x body length; flagellum 7-articulate, peduncle width less than 2 x article 2. *Antenna 2* 0.3 x body length, shorter than antenna 1; flagellum 4-articulate. *Mandibles* lacking molars; palp 3-articulate, ratio of articles 1–3, 1.0:1.4:0.6, article 2 with 4 distal setae and 1 proximal seta, article 3 with 2

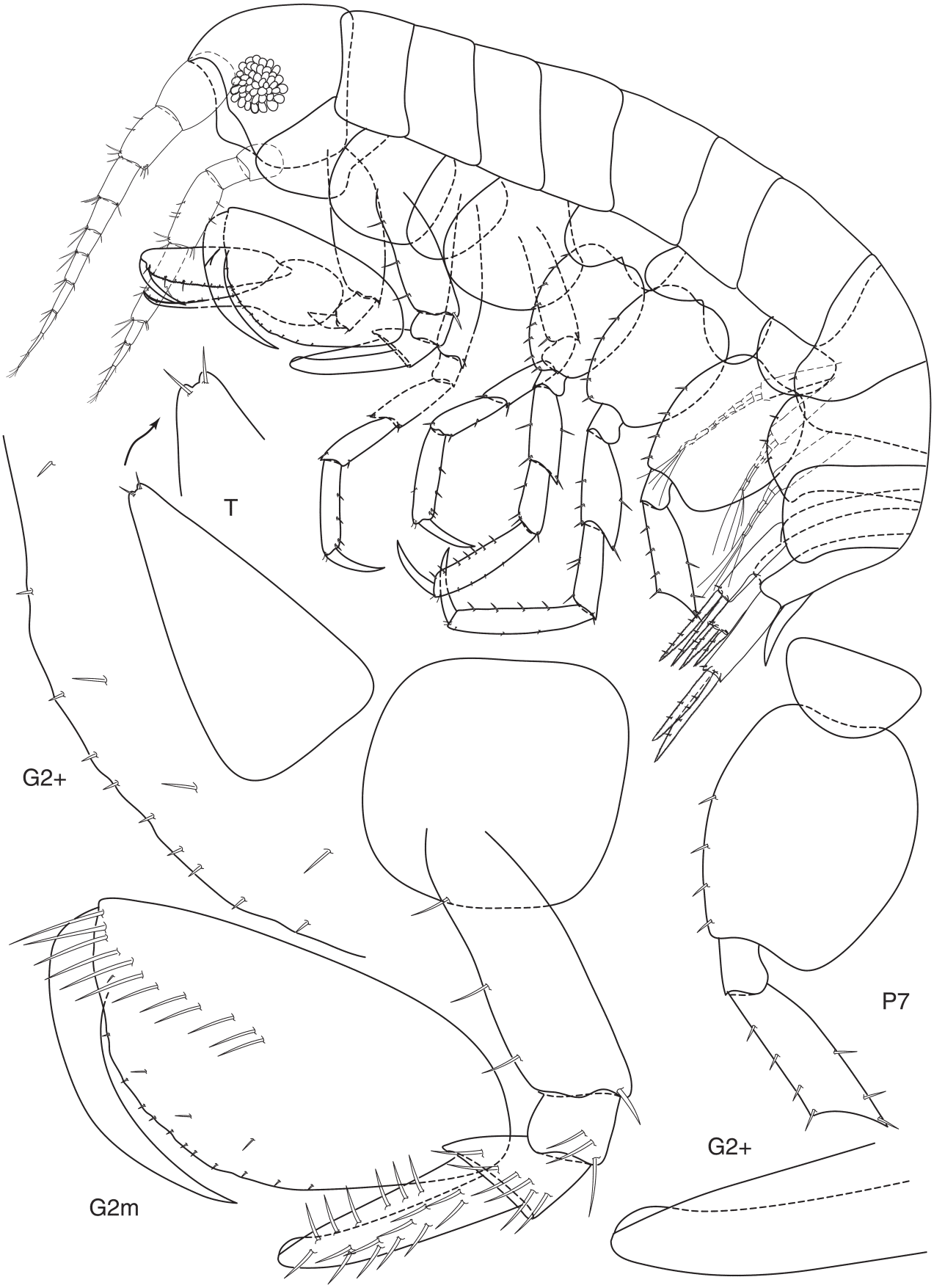

FIGURE 9. *Leucothoe eumilli* **sp. nov.**, holotype, male, 2.2 mm, AM P80177 (JDT/OPH 23), Fantome Island, Great Barrier Reef.

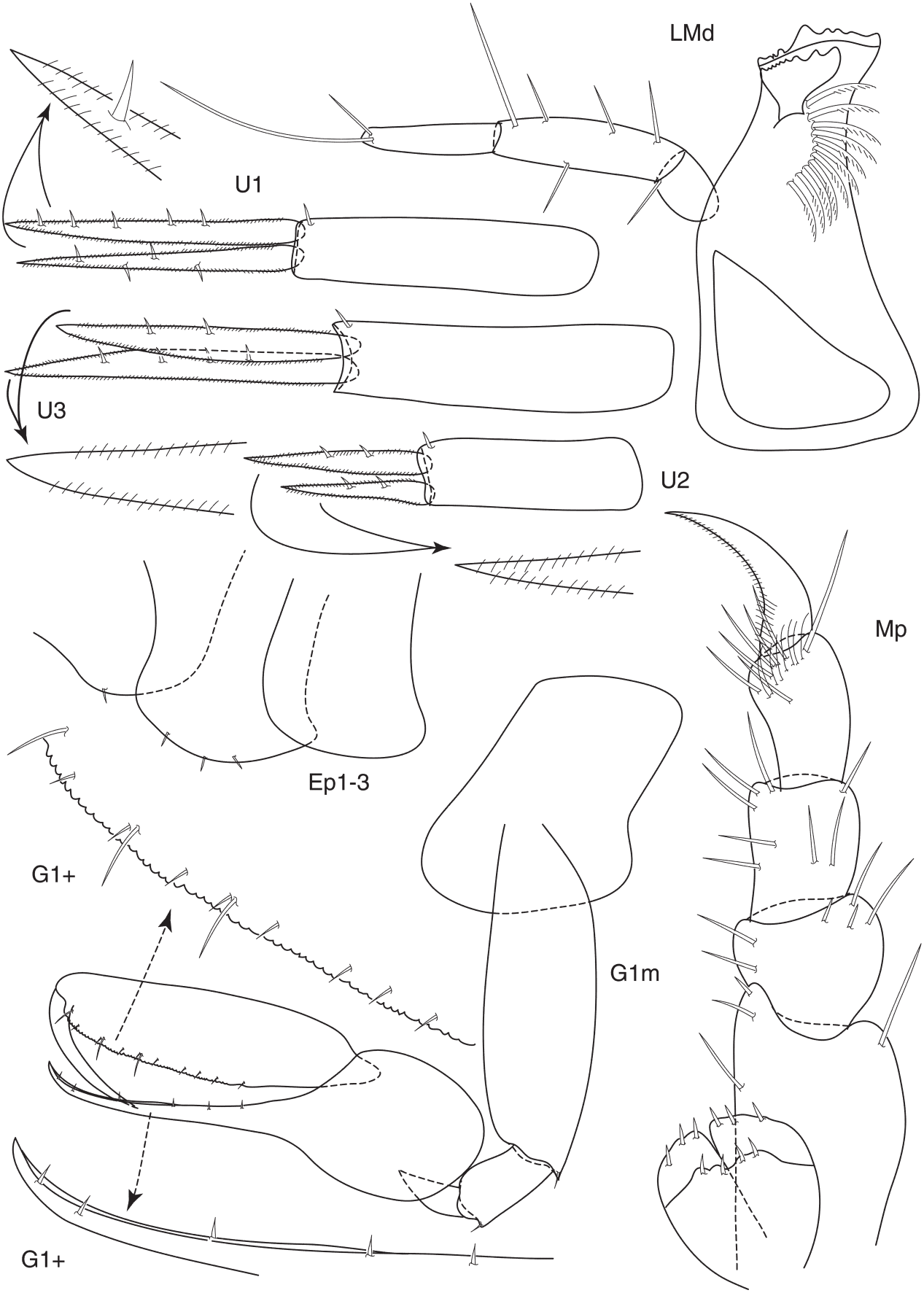

FIGURE 10. *Leucothoe eumilli* **sp. nov.**, holotype, male, 2.2 mm, AM P80177 (JDT/OPH 23), Fantome Island, Great Barrier Reef.

distal setae; incisors strongly dentate; left mandible lacinia mobilis large, strongly toothed, with 11 accessory setae; right mandible missing. *Upper* and *lower lips* and *maxillae 1* and *2* missing. *Maxilliped* inner plates fused, distal margin with v-shaped indentation, with short spines; outer plate smooth, reduced, reaching much less than half of palp article 1, with 2 distal setae and 1 distal spine; palp 4-articulate, article 4 wide, slightly recurved.

Pereon. *Coxae 1–4* relative widths 1.0:1.3:0.7:1.4. *Gnathopod 1* coxa smooth, bare, anterodistal corner produced, broadly rounded, distal margin rounded, posterodistal margin excavate, facial setae absent; basis constricted proximally, anterior and posterior margins bare; ischium with 1 posterodistal seta; carpus and propodus distally tapered, carpus length 25 x width, proximal margin smooth, distal margin bare; propodus straight, palm serrate with 3 distal setae; dactylus smooth, reaching 0.5 x propodus length. *Gnathopod 2* coxa length subequal to width, much wider than coxa 3, smooth, bare, anterodistally rounded, distal margin evenly rounded, posterior margin rounded, facial setae absent; basis slightly widened distally, without tubercles or serrations, anterior margin with 3 setae, posterior margin with 1 seta; ischium with 2 facial and 1 posterodistal seta; carpus 0.6 x propodus length, straight, distally truncate, anterior margin smooth; propodus posterior margin without spines/serrations, with 1 mediofacial setal row displaced to midline, reaching 0.4 x propodus length, 1 row of 3 submarginal setae, palm convex with 2 minor projections; dactylus recurved, proximal margin smooth, anterior margin distally acute, reaching 0.7 x propodus length. *Pereopod 3* coxa length 1.3 x width, anterodistal corner over-riding distal face of coxa 2, not extending below it, smooth, bare, anterior margin straight, distal margin oblique, posterior margin evenly rounded, facial setae absent. *Pereopod 4* coxa smooth, bare, anterior margin evenly rounded, distal margin evenly rounded, posterior margin mildly excavate, facial setae absent. *Pereopods 5–7* coxa facial setae absent; basis width length ratios 1:1.3, 1:1.2, 1:1.2, posterior margins smooth, bare.

Pleon. *Epimeron 1* with 1 ventral seta. *Epimeron 2* with 3 ventral setae. *Epimeron* 3 bare, posteroventral margin produced. *Uropods 1–3* relative lengths 1.0:0.7:1.1; inner and outer ramus lined with short marginal setae, with robust setae. *Uropod 1+3* peduncle subequal to inner ramus length; outer and inner ramus subequal in length. *Uropod 2* peduncle 1.3 x inner ramus length; outer ramus 0.8 x inner ramus length. *Telson* 1.8 x longer than wide, apex bidentate.

Female (sexually dimorphic characters). Unknown.

Habitat. In pink ball sponge on patch reef.

Remarks. *Leucothoe eumilli* **sp. nov.** is distinct in its anterior head cusp, its distally truncate gnathopod 2 carpus and its extremely short mediofacial setal row. A bidentate telson is also found in *L. basilobata*, *L. cheiriserra*, *L. commensalis, Leucothoe ctenochasma* Moore, 1987, *Leucothoe diemenensis* Myers, 1985c, *Leucothoe laticoxa* Ledoyer, 1978a and *Leucothoe sparsa* **sp. nov.**

Distribution. *Australia*. Queensland: Fantome Island (current study).

***Leucothoe hipposideros* sp. nov.**
(Figs 11, 12)

Type material. Holotype, male, 3.2 mm, AM P71233, Horseshoe Reef, Lizard Island (14°41.21'S 145°26.49'E), coral rubble, large coral bommies surrounded by sand and rubble, 11 m, C. Serejo, 2 March 2005 (QLD 1768). Paratype, male, 2.5 mm, AM P79805, Picnic Beach, Palfrey Island, Lizard Island (14°41.70'S 145°26.92'E), subtidal, patch reef, rubble with sand bottom, 2 m, S.E. LeCroy, 3 July 2001 (QLD SEL/LZI-2-1). Paratype, female, 2.0 mm, AM P79806, same station data as male paratype.

Additional material examined. 1 male, AM P79807 (SEL/LZI-2-3).

Type locality. Horseshoe Reef, Lizard Island, Queensland, Australia (14°41.21'S 145°26.49'E).

Etymology. After the Greek '*hipposideros*', meaning 'horseshoe' and referring to the type locality.

Description. Based on holotype, male, 3.2 mm, AM P71233.

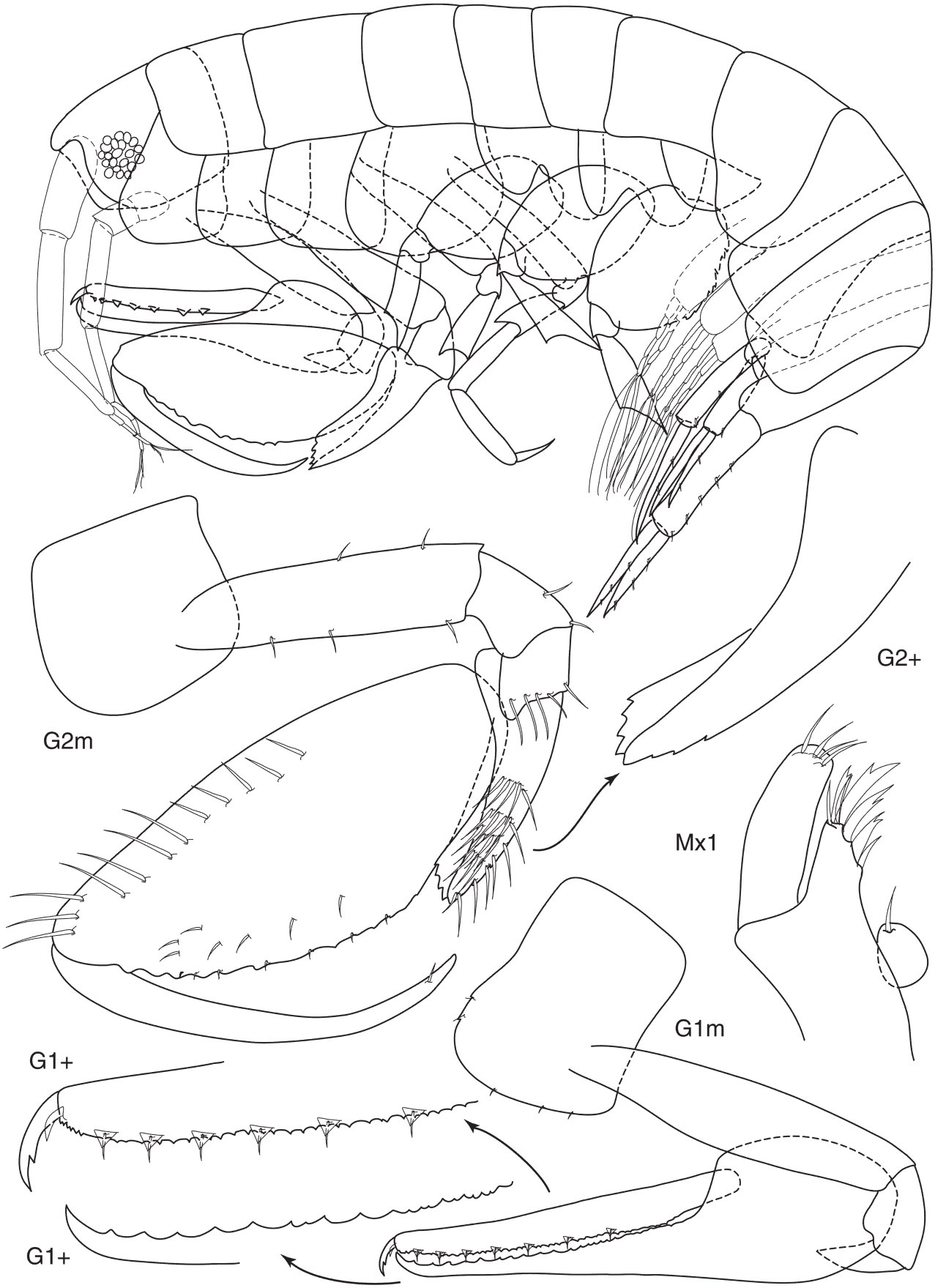

FIGURE 11. *Leucothoe hipposideros* **sp. nov.**, holotype, male, 3.2 mm, AM P71233 (QLD 1768), Horseshoe Reef, Lizard Island, Great Barrier Reef.

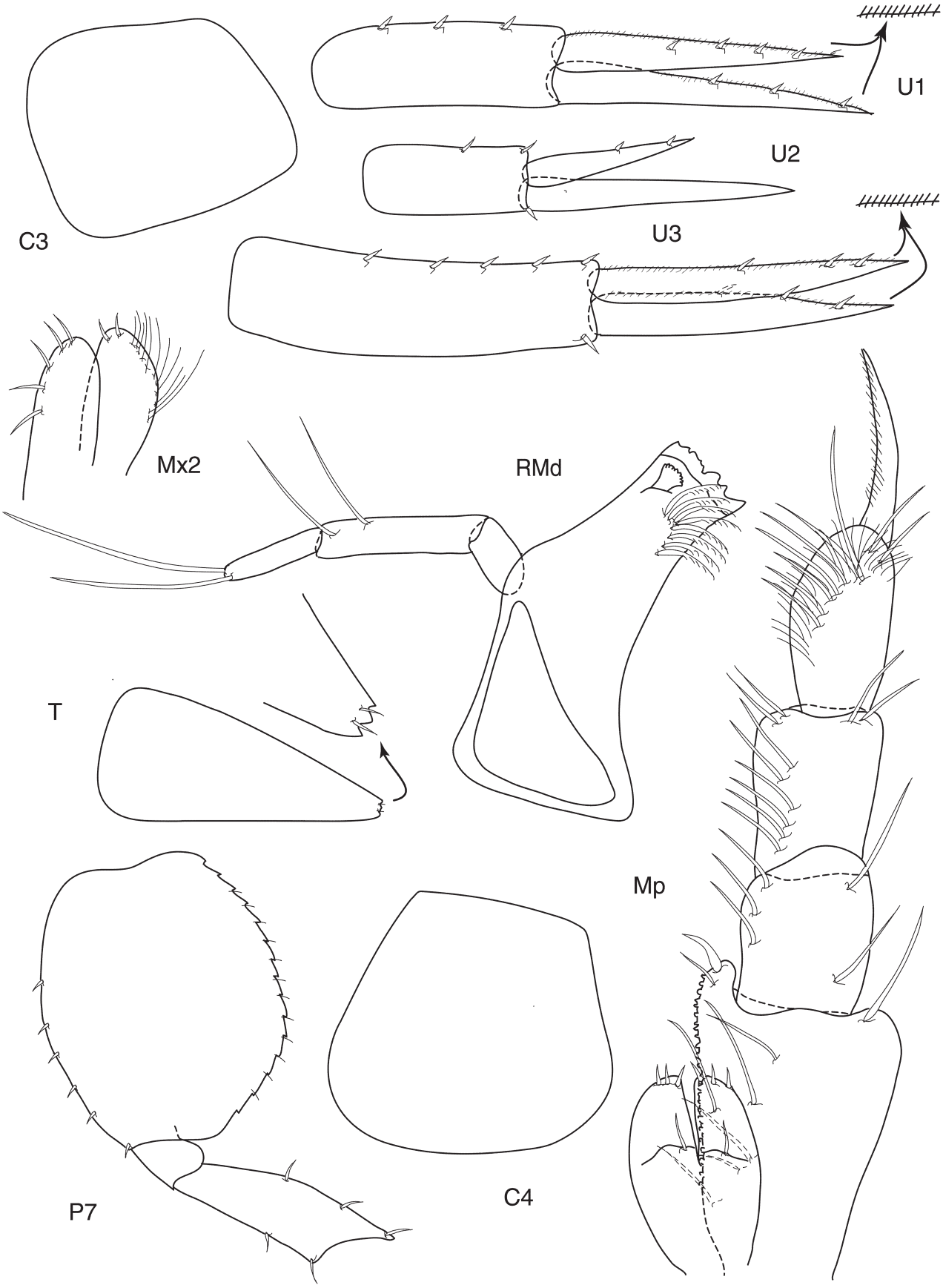

FIGURE 12. *Leucothoe hipposideros* **sp. nov.**, holotype, male, 3.2 mm, AM P71233 (QLD 1768), Horseshoe Reef, Lizard Island, Great Barrier Reef.

Head. *Head* length less than pereonite 1+2, anterior margin rounded, anterodistal margin rounded without cusp, ventral cephalic keel with small projection, rostrum small to medium; eyes with 10 or more ocelli, round. *Antenna 1* 0.3 x body length; flagellum 3-articulate, peduncle width less than 2 x article 2. *Antenna 2* 0.2 x body length, shorter than antenna 1; flagellum 3-articulate. *Mandibles* lacking molars, palp 3-articulate, ratio of articles 1–3, 1.0:2.2:1.4, article 2 with 2 distal setae, article 3 with 2 distal setae, incisors strongly dentate; left mandible lacinia mobilis large, strongly toothed, with 8 accessory setae; right mandible lacinia mobilis small, with 8 accessory setae. *Upper lip* asymmetrically lobate, anterior margin setose. *Lower lip* inner lobes fused, bare; outer lobes with moderate gape, anterior margins weakly setose. *Maxilla 1* palp 1-articulate with 4 distal setae; outer plate with 5 distal spines and 2 distal setae. *Maxilla 2* inner plate with 5 distal setae; outer plate with 2 robust setae and 10–11 thin distal setae. *Maxilliped* inner plates fused, distal margin with v-shaped indentation, with short spines and long setae; outer plate serrate, reduced, reaching less than half of palp article 1, with 6 distal setae and 1 distal spine; palp 4-articulate, article 4 slender, very slightly curved.

Pereon. *Coxae 1–4* relative widths 1.0:1.1:1.1:1.5. *Gnathopod 1* coxa serrate, setose, anterodistal corner produced, broadly rounded, distal margin straight, posterodistal margin rounded, facial setae absent; basis slightly constricted proximally, anterior and posterior margins bare; ischium bare; carpus and propodus distally tapered; carpus length 7.5 x width, proximal margin with denticles, distal margin bare; propodus straight, palm dentate with 7–9 distal setae and 7–9 large triangular teeth; dactylus with medial notch, reaching 0.1 x propodus length. *Gnathopod 2* coxa length 0.9 x width, subequal to coxa 3, smooth, bare, anterodistally rounded, distal margin evenly rounded, posterior margin straight, facial setae absent; basis slightly widened distally, without tubercles or serrations, anterior margin with 1–5 setae, posterior margin with 1–4 setae; ischium with 1 posterior and 1 distal seta; carpus 0.3 x propodus length, recurved, distally tapered, anterior margin serrate; propodus with 1 mediofacial setal row above midline, reaching 0.6 x propodus length, 2 rows of submarginal setae, palm convex with 6 minor projections, dactylus recurved, proximal margin smooth, anterior margin distally subacute, reaching 0.8 x propodus length. *Pereopod 3* coxa length 1.4 x width, anterodistal corner over-riding distal face of coxa 2 and extending below it, smooth, bare, anterior margin subquadrate, distal margin straight, posterior margin straight, facial setae absent. *Pereopod 4* coxa smooth, bare, anterior margin rounded, distal margin evenly rounded, posterior margin weakly excavate, facial setae absent. *Pereopods 5–7* coxa facial setae absent; basis width length ratios 1:1.3, 1:1.4, 1:1.3, posterior margins serrate, setose.

Pleon. *Epimera 1+3* bare. *Epimeron 2* with 2–3 ventral setae. *Epimeron 3* posteroventral margin narrowly rounded. *Uropods 1–3* relative lengths 1.0:0.8:1.2. *Uropod 1* peduncle 0.8 x inner ramus length. *Uropod 2* peduncle and outer ramus 0.6 x inner ramus length; inner ramus bare, outer ramus with 1 robust seta. *Uropod 3* peduncle and inner ramus subequal in length. *Uropod 1+3* outer and inner ramus subequal in length; inner and outer ramus lined with short marginal setae, with robust setae. *Telson* 2.2 x longer than wide, apex tridentate.

Female (sexually dimorphic characters). Based on paratype, female, 2.0 mm, AM P79806. *Gnathopod 1* propodus palm with 6 teeth. *Gnathopod 2* propodus palm with less prominent projections, fewer mediofacial setae; carpus anterior margin smooth.

Habitat. In coral rubble surrounding large coral bommies.

Remarks. *Leucothoe hipposideros* **sp. nov.** shares its uni-articulate maxilla 1 palp with *Leucothoe laevipalma* **sp. nov.**, *Leucothoe odontiskos* **sp. nov.**, *Leucothoe pollexa* **sp. nov.**, *Leucothoe sparsa* **sp. nov.**, *L. thula* **sp. nov.** and *L. undulata* **sp. nov**. This character has not been found in any described *Leucothoe* to date, although an "indistinct suture" in the maxilla 1 palp has been reported in *L. assimilis, L. basilobata*, *L. cheiriserra* and *L. urospinosa*. *Leucothoe hipposideros* shares its serrate maxilliped outer plate with *L. basilobata, L. cheiriserra*., *L. ctenochasma*, *Leucothoe laurensi* Thomas, 1995, *Leucothoe orkneyi* Holman & Watling, 1983, *Leucothoe squalidens* Ledoyer, 1984a, *L. laevipalma, L. odontiskos*, *L. serrata* **sp. nov.** and *L. undulata***.** The gnathopod 1 propodus shape and triangular teeth are similar to *L. cheiriserra* and *Leucothoe gavialis* Myers, 1985c. *Leucothoe hipposideros***.** resembles *L. cheiriserra* in its serrate posterior margins on

the basis of pereopods 5–7, but differs in its thin gnathopod 1 carpus and propodus, dentate gnathopod 1 carpus, gnathopod 1 dactylus notch, long gnathopod 2 mediofacial setal row, square coxa 3, longer uropod 1 and tridentate telson.

Distribution. *Australia*. Queensland: Lizard Island (current study).

***Leucothoe laevipalma* sp. nov.**
(Figs 13, 14)

Type material. Holotype, male, 2.2mm, AM P79808, patch reef off southern tip of Lizard Island (14°41'S 145°26'E), rubble, 1 m, J.D. Thomas, 23 January 1989 (JDT/LIZ 3). Paratype, female, 2.5 mm, AM P79809, North Point, Lizard Island (14°41'S 145°27'E), rubble sample from vertical cliffs and unconsolidated bottom rubble, 12.2 m, J.D. Thomas, 28 January 1989 (JDT/LIZ 13).

Additional material examined. 1 male, AM P79810 (JDT/LIZ 5); 1 female, 1 male, AM P79811 (QLD 1760); 1 male, 1 juvenile, GCRL2889 (SEL/LZI-2-3).

Type locality. Southern tip of Lizard Island, Queensland, Australia (14°41'S 145°26'E).

Etymology. After the Latin '*laevis*', meaning 'smooth,' and '*palma*', meaning 'the palm of the hand' and referring to the smooth gnathopod 1 propodus palm.

Description. Based on holotype, male, 2.2 mm, AM P79808.

Head. *Head* length less than pereonite 1+2, anterior margin rounded, without serrations or teeth, anterodistal margin rounded without cusp, ventral cephalic keel rounded, rostrum small to medium; eyes with 10 or more ocelli, round. *Antenna 1* 0.4 x body length; flagellum 7-articulate, peduncle width less than 2 x article 2. *Antenna 2* 0.3 x body length, shorter than antenna 1; flagellum 3-articulate. *Mandibles* lacking molars, palp 3-articulate, ratio of articles 1–3, 1.0:3.0:1.0, article 2 with 2–3 distal setae, article 3 with 2 distal setae, incisors strongly dentate; left mandible lacinia mobilis large, strongly toothed, with 7 accessory setae; right mandible lacinia mobilis small, with 8 accessory setae. *Upper lip* asymmetrically lobate, anterior margin setose. *Lower lip* inner lobes fused, bare; outer lobes with moderate gape, anterior margins weakly setose. *Maxilla 1* palp 1-articulate with 2 distal setae; outer plate with 3 distal spines and 3 distal setae. *Maxilla 2* inner plate with 5 distal setae; outer plate with 16 distal setae. *Maxilliped* inner plates fused, distal margin with v-shaped indentation, with short spines and long setae; outer plate serrate, reduced, reaching much less than half of palp article 1, with 4 distal setae and 1 distal spine; palp 4-articulate, article 4 slender, slightly recurved.

Pereon. *Coxae 1–4* relative widths 1.0:1.2:1.2:1.5. *Gnathopod 1* coxa smooth, setose, anterodistal corner produced, broadly rounded, distal margin straight, posterodistal margin rounded, facial setae absent; basis slightly constricted proximally, anterior margin bare, posterior margin with 1–5 setae; ischium bare; carpus and propodus distally tapered; carpus length 18.8 x width, proximal margin smooth, distal margin setose; propodus straight, palm smooth with 9–10 distal setae; dactylus smooth, reaching 0.2 x propodus length. *Gnathopod 2* length 0.9 x width, subequal to coxa 3, smooth, bare, anterodistally rounded, distal margin evenly rounded, posterior margin slightly concave, facial setae absent; basis constricted proximally, without tubercles or serrations, anterior margin with 1–8 setae, posterior margin with 1–5 setae; ischium with 1 posterior seta; carpus 0.4 x propodus length, straight, distally truncate, anterior margin serrate; propodus posterior margin without teeth/serrations, with 2 mediofacial setal rows, primary mediofacial setal row above midline, reaching 0.8 x propodus length, secondary mediofacial setal row with 3 setae, 1 row of 4 submarginal setae, palm convex with 5 minor projections; dactylus recurved, proximal margin smooth, anterior margin distally acute, reaching 0.9 x propodus length. *Pereopod 3* coxa length and width subequal, anterodistal corner over-riding distal face of coxa 2 and extending below it, smooth, setose, anterior margin evenly rounded, distal margin slightly convex, posterior margin slightly excavate, facial setae absent. *Pereopod 4* coxa smooth, setose, anterior margin evenly rounded, distal margin evenly rounded, posterior margin tapered, facial setae absent. *Pereopods 5–7* coxa facial setae absent; basis width length ratios 1:1.3, 1:1.5, 1:1.3, posterior margins smooth, setose.

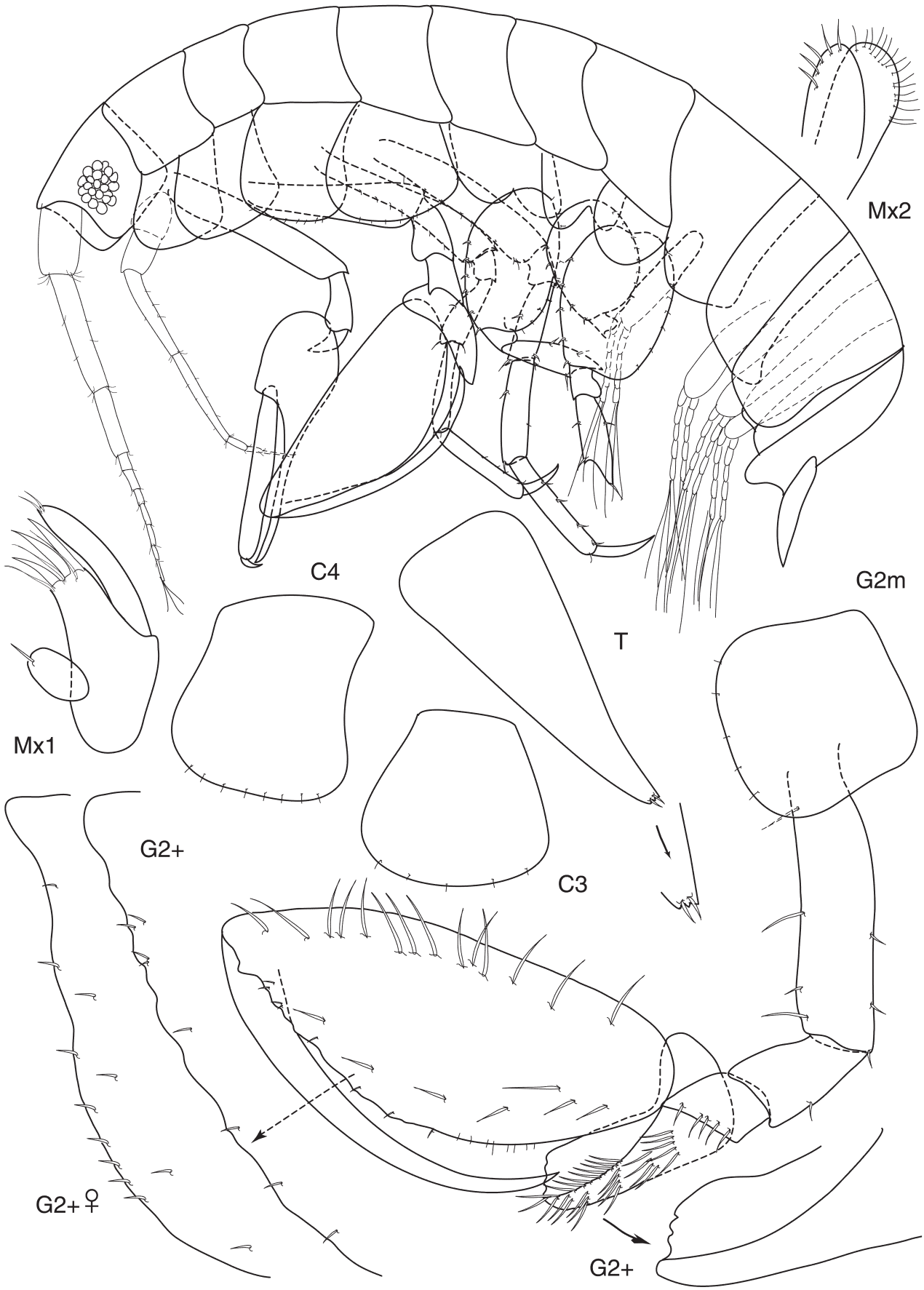

FIGURE 13. *Leucothoe laevipalma* **sp. nov.**, holotype, male, 2.2 mm, AM P79808; paratype, female, 2.5 mm, AM P79809 (JDT/LIZ 13), southern tip of Lizard Island, Great Barrier Reef.

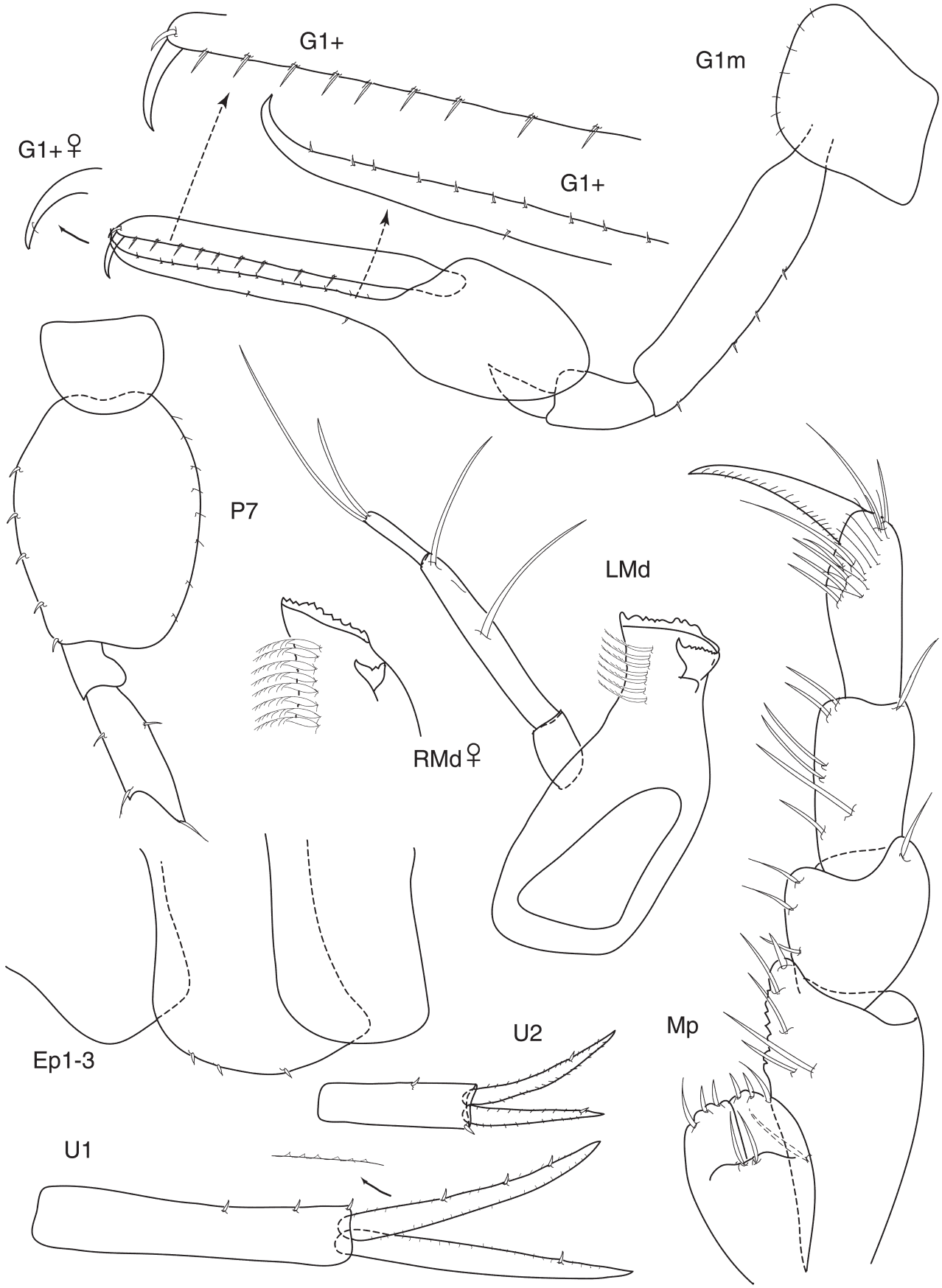

FIGURE 14. *Leucothoe laevipalma* **sp. nov.**, holotype, male, 2.2 mm, AM P79808; paratype, female, 2.5 mm, AM P79809 (JDT/LIZ 3), Lizard Island, Great Barrier Reef.

Pleon. *Epimera 1–3* bare. *Epimeron 2* with 3 ventral setae. *Epimeron 3* posteroventral corner subquadrate. *Uropod 3* missing. *Uropods 1–2* relative lengths 1.0:0.5. *Uropod 1* peduncle subequal in length with inner ramus; outer ramus subequal in length with inner ramus. *Uropod 2* peduncle 0.8 x inner ramus length; outer ramus 0.7 x inner ramus length. *Uropods 1–2* inner ramus lined with short marginal setae, with 1 robust seta; outer ramus lined with short marginal setae, with robust setae. *Telson* 2.4 x longer than wide, apex tridentate.

Female (sexually dimorphic characters). Based on paratype, female, 2.5 mm, AM P79809. *Gnathopod 2* basis anterior margin with 1–3 setae; propodus single mediofacial setal row above midline, reaching 0.6 x propodus length.

Habitat. In coral rubble.

Remarks. *Leucothoe laevipalma* **sp. nov.** shares its uni-articulate maxilla 1 palp with *L. hipposideros* **sp. nov.**, *L. odontiskos* **sp. nov.**, *L. pollexa* **sp. nov.**, *L. sparsa* **sp. nov.**, *L. thula* **sp. nov.** and *L. undulata* **sp. nov**. This character has not been found in any described *Leucothoe* to date, although an "indistinct suture" in the maxilla 1 palp has been reported in *L. assimilis, L. basilobata*, *L. cheiriserra* and *L. urospinosa*. *Leucothoe laevipalma* shares its serrate maxilliped outer plate with *L. basilobata, L. cheiriserra*, *L. ctenochasma*, *L. laurensi*, *L. orkneyi*, *L. squalidens*, *L. hipposideros, L. odontiskos*, *L. serrata* **sp. nov.** and *L. undulata*. The smooth gnathopod 1 propodus palm is similar to *L. flammosa, Leucothoe bova* **sp. nov.,** *Leucothoe odontiskos* and *L. serrata*. *L. laevipalma* differs from *L. serrata* in its gnathopod 1 propodus palm dentition. *Leucothoe laevipalma* is similar to *Leucothoe ashleyae, Leucothoe barana*, females of *Leucothoella gracilis* (Haswell, 1879), *Leucothoe kensleyi*, *L. ubouhu, L. bova* **sp. nov.**, *L. laevipalma, Leucothoe makrommatos* **sp. nov.** and *L. undulata* in its gnathopod 2 propodus secondary mediofacial setal row.

Distribution. *Australia*. Queensland: Lizard Island (current study).

***Leucothoe makrommatos* sp. nov.**
(Figs 15, 16, Pl. 4A)

Type material. Holotype, male, 5.6 mm, AM P79820, Three Sisters Bommie, Yonge Reef (14°36.104'S 145°37.126'E), in ascidian host on a back reef bommie, 12 m, K. Klebba, 3 March 2005 (QLD 1789). Paratype, female, 6.0 mm, AM P79821, same station data.

Additional material examined. 1 male, AM P70697 (QLD 1643); 1 male, AM P71207 (QLD 1755); 1 female, 1 male, AM P71213 (QLD 1760); 4 females, 3 males, AM P71353 (QLD 1789); 1 female, AM P71458 (QLD 1789); 1 male, AM P79822 (QLD 1820).

Type locality. Yonge Reef, Queensland, Australia (14°36.104'S 145°37.126'E).

Etymology. After the Greek '*makros*', meaning 'long' and '*omma*', meaning 'eye' and referring to the elongate eye shape of this species.

Description. Based on holotype, male, 5.6 mm, AM P79820.

Head. *Head* length less than pereonites 1+2, anterior margin rounded, without serrations or teeth, anterodistal margin rounded without cusp, ventral cephalic keel subquadrate, rostrum small to medium; eyes with 10 or more ocelli, elongate. *Antenna 1* 0.3 x body length; flagellum 7-articulate, peduncle width less than 2 x article 2. *Antenna 2* 0.2 x body length, shorter than antenna 1; flagellum 4-articulate. *Mandibles* lacking molars, palp 3-articulate, ratio of articles 1–3, 1.0: 2.5:1.8, article 2 with 5 distal setae, article 3 with 2 distal setae, incisors strongly dentate; left mandible lacinia mobilis large, weakly toothed, with 10 accessory setae; right mandible lacinia mobilis small, with 10 accessory setae. *Upper lip* asymmetrically lobate, anterior margin setose. *Lower lip* inner lobes fused, bare; outer lobes with moderate gape, anterior margins strongly setose. *Maxilla 1* palp 2-articulate with 4 distal setae; outer plate with 5 distal spines and 4 distal setae. *Maxilla 2* inner plate with nine distal and 10 proximal setae; outer plate with 20 distal setae. *Maxilliped* inner plates fused, distal margin with v-shaped indentation, with short spines; outer plate smooth, reduced, reaching less than half of palp article 1, with 2 distal setae and 1 distal spine; palp 4-articulate, article 4 slender, slightly recurved.

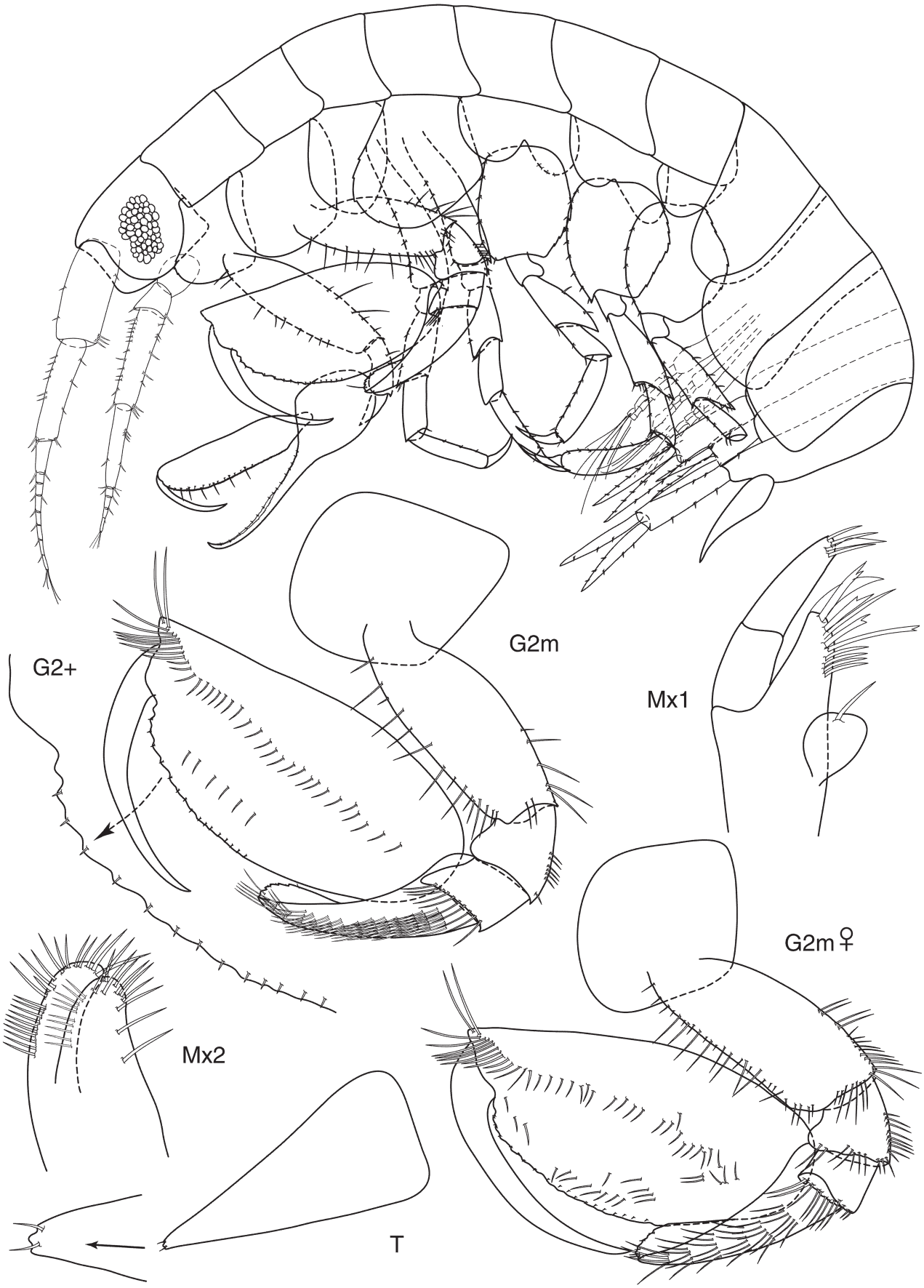

FIGURE 15. *Leucothoe makrommatos* **sp. nov.**, holotype, male, 5.6 mm, AM P79820; paratype, female, 6.0 mm, AM P79821 (QLD 1789), Yonge Reef, Great Barrier Reef.

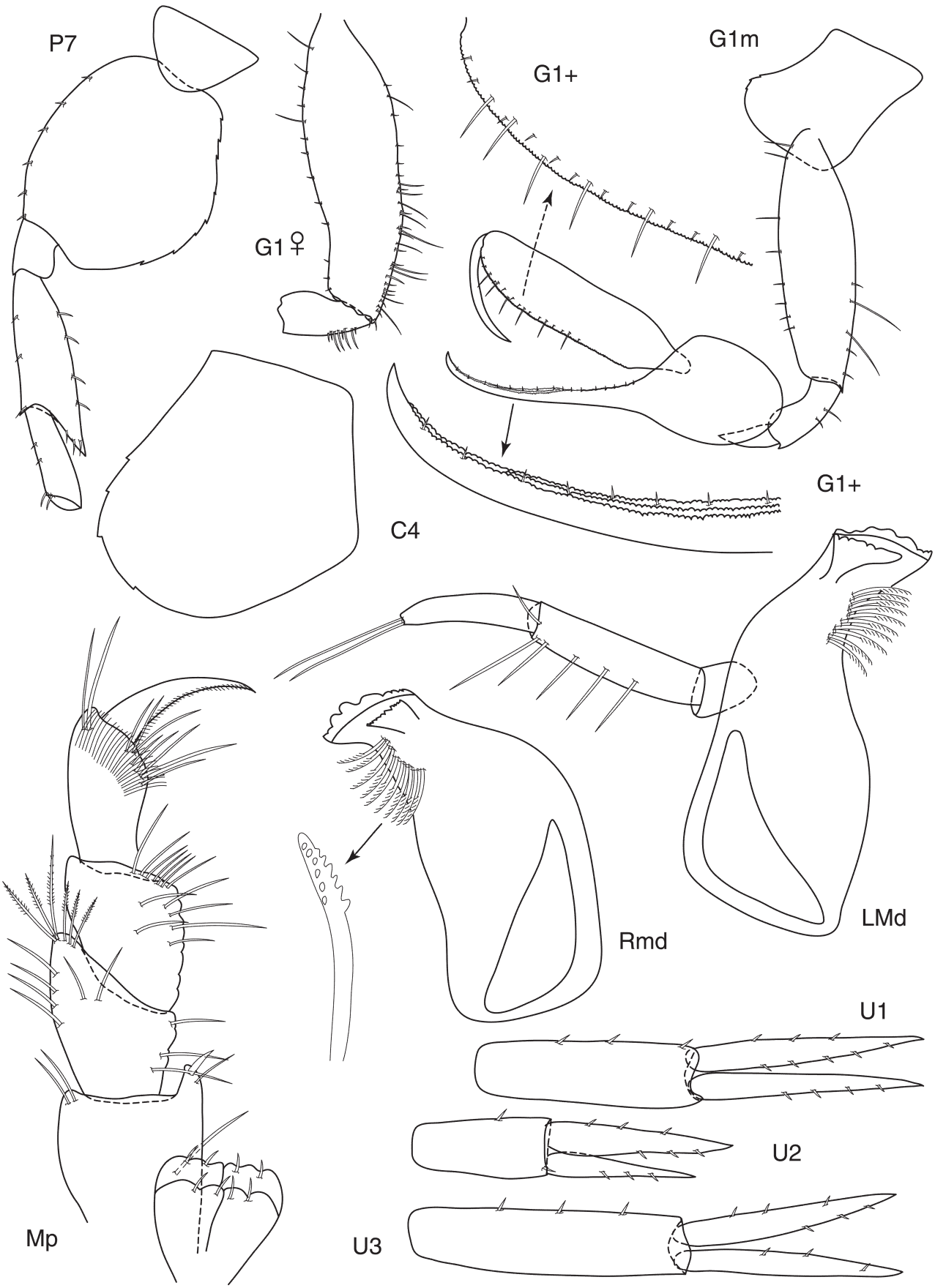

FIGURE 16. *Leucothoe makrommatos* **sp. nov.**, holotype, male, 5.6 mm, AM P79820; paratype, female, 6.0 mm, AM P79821 (QLD 1789), Yonge Reef, Great Barrier Reef.

Pereon. *Coxae 1–4* relative widths 1.0:1.4:0.9:1.6. *Gnathopod 1* coxa serrate, bare, anterodistal corner produced, narrowly rounded, distal margin straight, posterodistal margin rounded, facial setae absent; basis constricted proximally, anterior margin with 8–10 setae, posterior margin with 5–6 setae; ischium with 2 posterior setae; carpus and propodus distally tapered; carpus length 13.6 x width, proximal margin serrate, distal margin bare; propodus straight, palm serrate with 6 distal setae; dactylus smooth, reaching 0.5 x propodus length. *Gnathopod 2* coxa length 0.8 x width, slightly wider than coxa 3, smooth, bare, anterodistally rounded, distal margin evenly rounded, posterior margin straight, facial setae absent; basis posterior margin slightly expanded, without tubercles or serrations, anterior margin with 15–16 setae, posterior margin with 5–6 setae; ischium with 7 posterior setae; carpus 0.6 x propodus length, recurved, distally expanded, anterior margin serrate; propodus posterior margin without teeth/serrations, with 1 mediofacial setal row slightly displaced to midline, subequal with propodus length, 1 row of 6 submarginal setae, palm convex with 6 minor projections; dactylus curved, proximal margin smooth, anterior margin distally acute, reaching 0.7 x propodus length. *Pereopod 3* coxa length 1.4 x width, anterodistal corner overriding distal face of coxa 2 and extending below it, smooth, bare, anterior margin evenly rounded, distal margin oblique, posterior margin evenly rounded, facial setae absent. *Pereopod 4* coxa serrate, bare, anterior margin evenly rounded, distal margin produced, posterior margin tapered, facial setae absent. *Pereopods 5–7* coxa facial setae absent; basis width length ratios 1:1.2, 1:1.2, 1:1.2, posterior margins serrate, bare.

Pleon. *Epimera 1–3* bare. *Epimeron 3* posteroventral margin subquadrate. *Uropods 1–3* relative lengths 1.0:0.7:1.1; inner and outer ramus with robust setae. *Uropod 1* peduncle subequal in length with inner ramus. *Uropod 2* peduncle 0.7 x inner ramus length; outer ramus 0.8 x inner ramus length. *Uropod 3* peduncle 1.2 x inner ramus length. *Uropod 1+3* outer ramus subequal to inner ramus length. *Telson* 2.1 x longer than wide, apex tridentate.

Female (sexually dimorphic characters). Based on paratype, female, 6.0 mm, AM P79821. *Gnathopod 1* basis anterior margin with 13–15 setae; posterior margin with 29–30 alternating short and long setae; ischium with 8 posterior setae. *Gnathopod 2* basis anterior margin with 28–30 short and long setae; posterior margin with 15 setae; ischium posterior margin with 8 setae; distal margin with 10 setae; propodus with 17 submarginal setae in 2 indistinct rows.

Habitat. In branchial chamber of an unidentified ascidian species.

Remarks. The elongate eyes of *L. makrommatos* **sp. nov.** are distinct. *Leucothoe makrommatos* appears to be closely related to *L. wuriti* and *Leucothoe epidemos* **sp. nov.**, both found in ascidian hosts. *Leucothoe makrommatos* differs from *L. wuriti* and *L. epidemos* in its gnathopod 1 basis posterior setae, its less displaced gnathopod 2 propodus mediofacial setal row and its less prominent gnathopod 2 propodus palm projections. The posterior setae on gnathopod 1 basis is shared with females of *L. saron*, *L. ubouhu* and *L. bova* **sp. nov.** The serrate coxa 1 and 4 anterodistal margins are shared with *L. banwarthii*, *L. gracilis* and *L. serrata* **sp. nov.** *Leucothoe makrommatos* is similar to *L. ashleyae,* females of *L. assimilis,* females of *L. banwarthii*, *L. barana, L. kensleyi*, *L. ubouhu, L. bova* **sp. nov.***, L laevipalma* **sp. nov.***, L. odontiskos* **sp. nov**. and *L. undulata* **sp. nov.** in its gnathopod 2 propodus secondary mediofacial setal row.

Distribution. *Australia*. Queensland: Lizard Island (current study).

***Leucothoe odontiskos* sp. nov.**
(Figs 17, 18)

Type material. Holotype, male, 2.8 mm, AM P79812, North Point, Lizard Island (~14°38'S 145°27'E), rubble sample from vertical cliffs and unconsolidated bottom rubble, 12.2 m, J.D. Thomas, 28 January 1989 (JDT/LIZ 13). Paratype, female, 2.5 mm, AM P79813, same station data.

Additional material examined. 1 female, 1 male (JDT/LIZ 13).

Type locality. North Point, Lizard Island, Queensland, Australia (~14°38'S 145°27'E).

Etymology. After the Greek '*odontiskos*', meaning 'little tooth' and referring to the tooth-like dentition along the gnathopod 1 propodus palm.

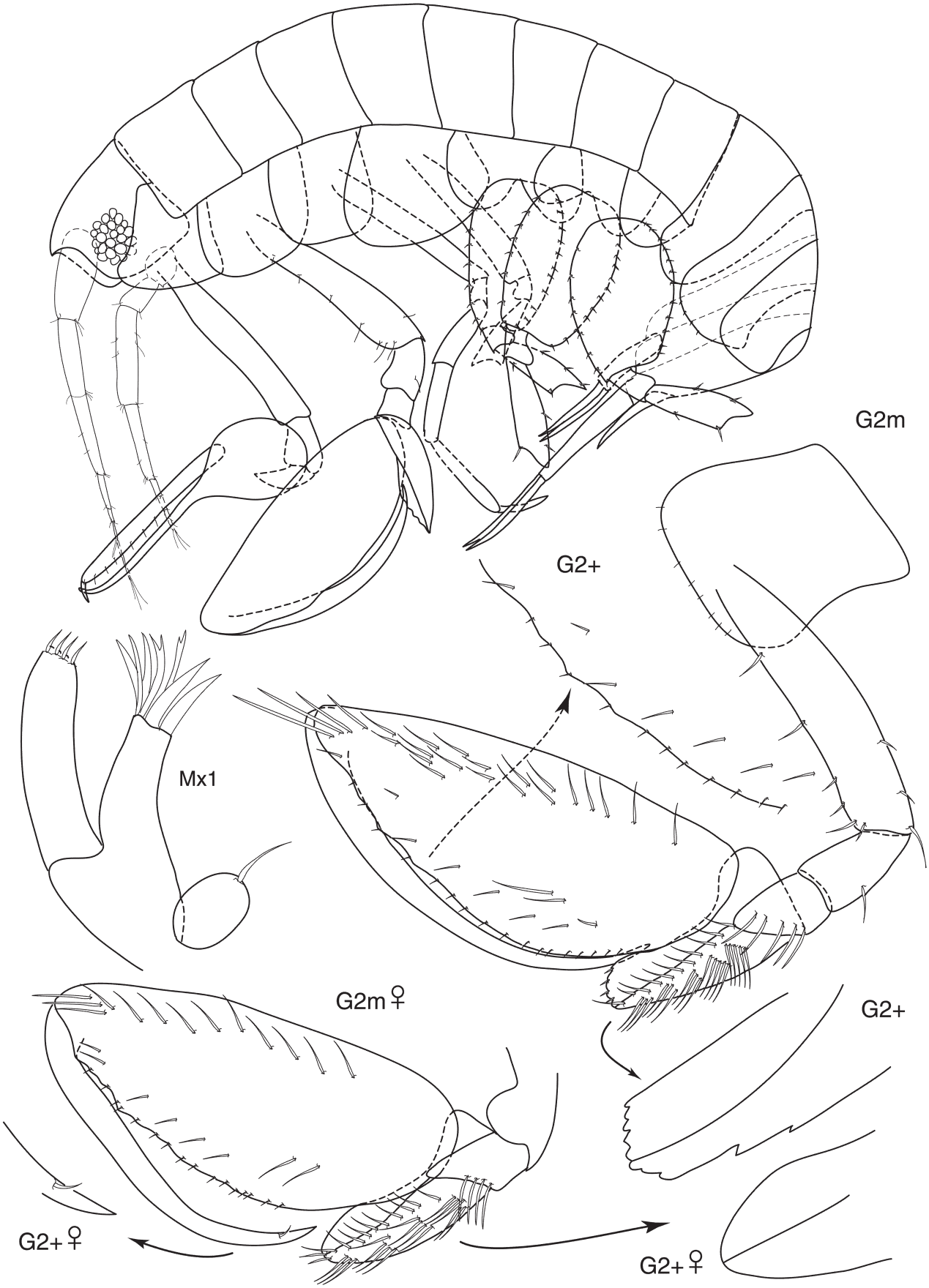

FIGURE 17. *Leucothoe odontiskos* **sp. nov.**, holotype, male, 2.8 mm, AM P79812; paratype, female, 2.5 mm, AM P79813 (JDT/LIZ 13), North Point, Lizard Island, Great Barrier Reef.

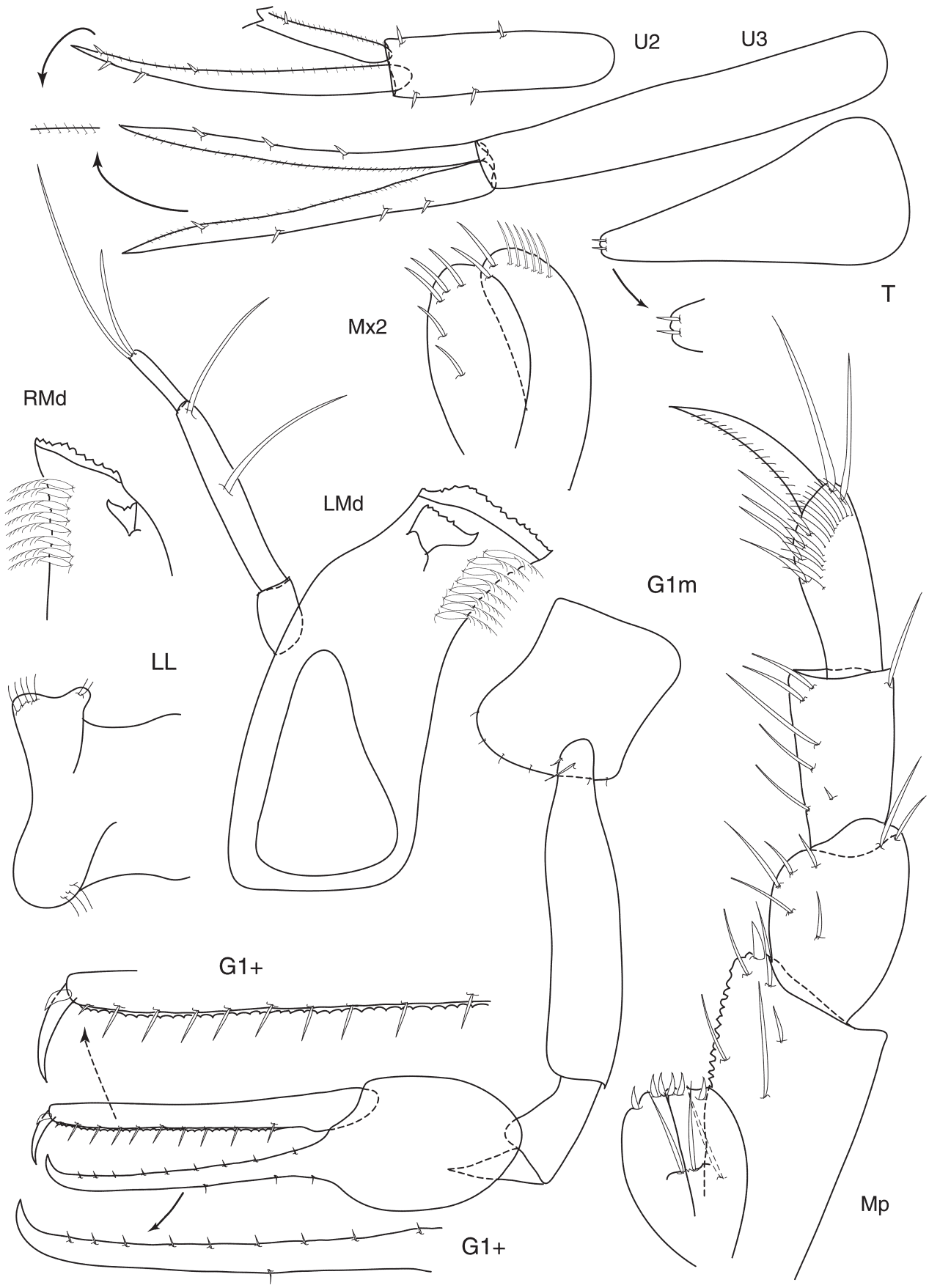

FIGURE 18. *Leucothoe odontiskos* **sp. nov.**, holotype, male, 2.8 mm, AM P79812 (JDT/LIZ 13), North Point, Lizard Island, Great Barrier Reef.

Description. Based on holotype, male, 2.8 mm, AM P79812.

Head. *Head* length less than pereonite 1+2, anterior margin rounded, without serrations or teeth, anterodistal margin subquadrate without cusp, ventral cephalic keel rounded, rostrum small to medium; eyes with 10 or more ocelli, round. *Antenna 1* 0.3 x body length; flagellum 5-articulate, peduncle width less than 2 x article 2. *Antenna 2* 0.3 x body length, shorter than antenna 1; flagellum 4-articulate. *Mandibles* lacking molars, palp 3-articulate, ratio of articles 1–3, 1.0:3.8:1.4, article 2 with 2 distal setae, article 3 with 2 distal setae, incisors strongly dentate; left mandible lacinia mobilis large, strongly toothed, with 8 accessory setae; right mandible lacinia mobilis small, with 8 accessory setae. *Upper lip* asymmetrically lobate, anterior margin weakly setose. *Lower lip* inner lobes fused, bare; outer lobes with moderate gape, anterior margins weakly setose. *Maxilla 1* palp 1-articulate with 4 distal setae; outer plate with 7 distal spines. *Maxilla 2* inner plate with 8 distal setae; outer plate with 5 distal setae. *Maxilliped* inner plates fused, distal margin with v-shaped indentation, with short spines and long setae; outer plate serrate, reduced, reaching less than half of palp article 1, with 5 distal setae and 1 distal spine; palp 4-articulate, article 4 slender, slightly recurved.

Pereon. *Coxae 1–4* relative widths 1.0:1.0:0.9:1.4. *Gnathopod 1* coxa smooth, bare, anterodistal corner produced, broadly rounded, distal margin straight, posterodistal margin subquadrate, facial setae absent; basis constricted proximally, anterior margin with 2 short setae, posterior margin bare; ischium bare; carpus and propodus distally tapered; carpus length 19.3 x width, distal ornamentation absent, proximal margin smooth, distal margin setose; propodus straight, palm dentate with nine distal setae; dactylus smooth, reaching 0.2 x propodus length. *Gnathopod 2* coxa length subequal to width, slightly wider than coxa 3, smooth, setose, anterodistally rounded, distal margin evenly rounded, posterior margin straight, facial setae absent; basis linear, without tubercles or serrations, anterior margin with 4–8 setae, posterior margin with 1–5 setae; ischium with 1 posterior seta; carpus 0.4 x propodus length, straight, distally truncate, anterior margin serrate; propodus posterior margin without teeth/serrations, with 2 mediofacial setal rows, primary mediofacial setal row above midline, reaching 0.9 x propodus length, secondary mediofacial setal row with 3 setae, 1 row of 6 submarginal setae; palm convex with 3 minor projections; dactylus slightly recurved, proximal margin smooth, anterior margin distally subacute, reaching 0.9 x propodus length. *Pereopod 3* coxa length 1.2 x width, anterodistal corner over-riding distal face of coxa 2 and extending below it, smooth, setose, anterior margin evenly rounded, distal margin straight, posterior margin straight, facial setae absent. *Pereopod 4* coxa smooth, setose, anterior margin rounded, distal margin evenly rounded, posterior margin tapered, facial setae absent. *Pereopods 5–7* coxa facial setae absent; basis width length ratios 1:1.6, 1:1.5, 1:1.5, posterior margins smooth, setose.

Pleon. *Epimera 1–3* bare. *Epimeron 2* with 3 ventral setae. *Epimeron 3* posteroventral margin subquadrate. *Uropod 1* missing. *Uropods 2–3* relative lengths 1.0:1.4; inner and outer ramus lined with short marginal setae, with robust setae. *Uropod 2* peduncle 0.7x inner ramus length; outer ramus broken, length unknown. *Uropod 3* peduncle subequal in length with inner ramus; outer ramus subequal in length with inner ramus. *Telson* 2.2 x longer than wide, apex tridentate.

Female (sexually dimorphic characters). Based on paratype, female, 2.5 mm, AM P79813. *Gnathopod 1* carpus without distal setae. *Gnathopod 2* carpus anterior margin smooth; dactylus with proximal spine, strongly recurved.

Habitat. In coral rubble from vertical cliffs and unconsolidated bottom rubble.

Remarks. *Leucothoe odontiskos* **sp. nov.** shares its uni-articulate maxilla 1 palp with *L. hipposideros* **sp. nov.**, *L. laevipalma* **sp. nov.,** *L. pollexa* **sp. nov.,** *L. sparsa* **sp. nov.**, *L. thula* **sp. nov.** and *L. undulata* **sp. nov**. This character has not been found in any described *Leucothoe* to date, although an "indistinct suture" in the maxilla 1 palp has been reported in *L. assimilis, L. basilobata*, *L. cheiriserra* and *L. urospinosa*. *Leucothoe odontiskos* **sp. nov.** shares its serrate maxilliped outer plate with *L. basilobata, L. cheiriserra*., *L. ctenochasma*, *L. laurensi*, *L. orkneyi*, *L. squalidens*, *L. hipposideros*, *L. laevipalma* **sp. nov.**, *L. serrata* **sp. nov.** and *L. undulata*. The dentate propodus palm of gnathopod 1 is similar to *L. ashleyae*; *L. basilobata*; *L. hipposideros* and *L. undulata*, but lacks the triangular teeth found in *L. hipposideros*. This species is similar to *L. ashleyae,* females of *L. assimilis, L. barana,* females of *L. gracilis, L. kensleyi*, *L. ubouhu, L. bova* **sp. nov.**,

L. laevipalma, *L. makrommatos* **sp. nov.** and *L. undulata* in its gnathopod 2 propodus secondary mediofacial setal row.

Distribution. *Australia*. Queensland: Lizard Island (current study).

***Leucothoe pollexa* sp. nov.**
(Figs 19, 20)

Type material. Holotype, male, 4.8 mm, AM P79815; Picnic Beach, Palfrey Island, Lizard Island (14°41.70'S 145°26.92'E), subtidal, protected beach, poorly sorted coral sand with pieces of old coral, 0.3 m, S.E. LeCroy, 3 July 2001 (SEL/LZI-2-2). Paratype, female, 4.9 mm, AM P79816; Casuarina Beach, Lizard Island (14°40.77'S 145°26.85'E), subtidal, protected beach, fine, slightly muddy sand, 0.5 m, S.E. LeCroy, 5 July 2001 (SEL/LZI-5-1).

Additional material examined. 1 female, AM P70624 (QLD 1621); 1 male, AM P70953 (QLD 1697); 4 females, 2 juveniles, AM P79868 (SEL/LZI-1-1); 2 females, 1 juvenile, GCRL2890 (SEL/LZI-1-1).

Type locality. Palfrey Island, Lizard Island, Queensland, Australia (14°41.70'S 145°26.92'E).

Etymology. After the Latin '*pollex*', meaning 'thumb' and referring to the subapical tooth on the gnathopod 2 carpus.

Description. Based on holotype, male, 4.8 mm, AM P79815.

Head. *Head* length less than pereonite 1+2, anterior margin truncate, without serrations or teeth, anterodistal margin rounded without cusp, ventral cephalic keel subquadrate, rostrum small to medium; eyes with 10 or more ocelli, round. *Antenna 1* 0.3 x body length; flagellum 8-articulate, peduncle width less than 2 x article 2, article 3 short. *Antenna 2* 0.3 x body length, shorter than antenna 1; flagellum 4-articulate. *Mandibles* lacking molars, palp 3-articulate, ratio of articles 1–3, 1.0:3.6:1.9, article 2 with 4 distal setae, article 3 with 2 distal setae, incisors strongly dentate; left mandible lacinia mobilis large, strongly toothed, with 8 accessory setae; right mandible lacinia mobilis small, with 7 accessory setae. *Upper lip* asymmetrically lobate, anterior margin setose. *Lower lip* inner lobes fused, bare; outer lobes with moderate gape, anterior margins weakly setose. *Maxilla 1* palp 1-articulate with 3 distal setae; outer plate with 7 distal spines and 2 distal setae. *Maxilla 2* inner plate with 3 distal setae; outer plate with 3 robust and 9–11 thin distal setae. *Maxilliped* inner plates fused, distal margin evenly rounded, with short spines and long setae; outer plate smooth, vestigial, barely exceeding margin of palp article 1, with 3 distal setae and 1 distal spine; palp 4-articulate, article 4 slender, recurved.

Pereon. *Coxae 1–4* relative widths 1.0:1.2:1.0:1.3. *Gnathopod 1* coxa smooth, bare, anterodistal corner produced, narrowly rounded, distal margin rounded, posterodistal margin subquadrate, with 1 facial seta; basis constricted proximally, anterior and posterior margins bare; ischium bare; carpus and propodus distally tapered; carpus length 10 x width, proximal margin serrate, distal margin setose; propodus straight, palm serrate with 4–5 distal setae; dactylus smooth, reaching 0.2 x propodus length. *Gnathopod 2* coxa length 0.8 x width, slightly wider than coxa 3, smooth, bare, anterodistally rounded, distal margin evenly rounded, posterior margin straight, facial setae absent; basis slightly constricted proximally, without tubercles or serrations, anterior and posterior margins bare; ischium bare; carpus 0.3 x propodus length, curved with large subdistal tooth, anterior margin serrate; propodus posterior margin with few small teeth/serrations, with 1 mediofacial setal row above midline, reaching 0.8 x propodus length, 1 row of 8 submarginal setae, palm linear with 3 major projections; dactylus strongly recurved, proximal margin smooth, anterior margin distally acute, reaching 0.7 x propodus length. *Pereopod 3* coxa length 1.3 x width, anterodistal corner over-riding distal face of coxa 2 and extending below it, smooth, bare, anterior margin evenly rounded, distal margin oblique, posterior margin evenly rounded, facial setae absent. *Pereopod 4* coxa smooth, bare, anterior margin straight, distal margin produced, posterior margin excavate, facial setae absent. *Pereopods 5–7* coxa facial setae absent; basis width length ratios 1:1.3, 1:1.3, 1:1.2, posterior margins smooth, bare.

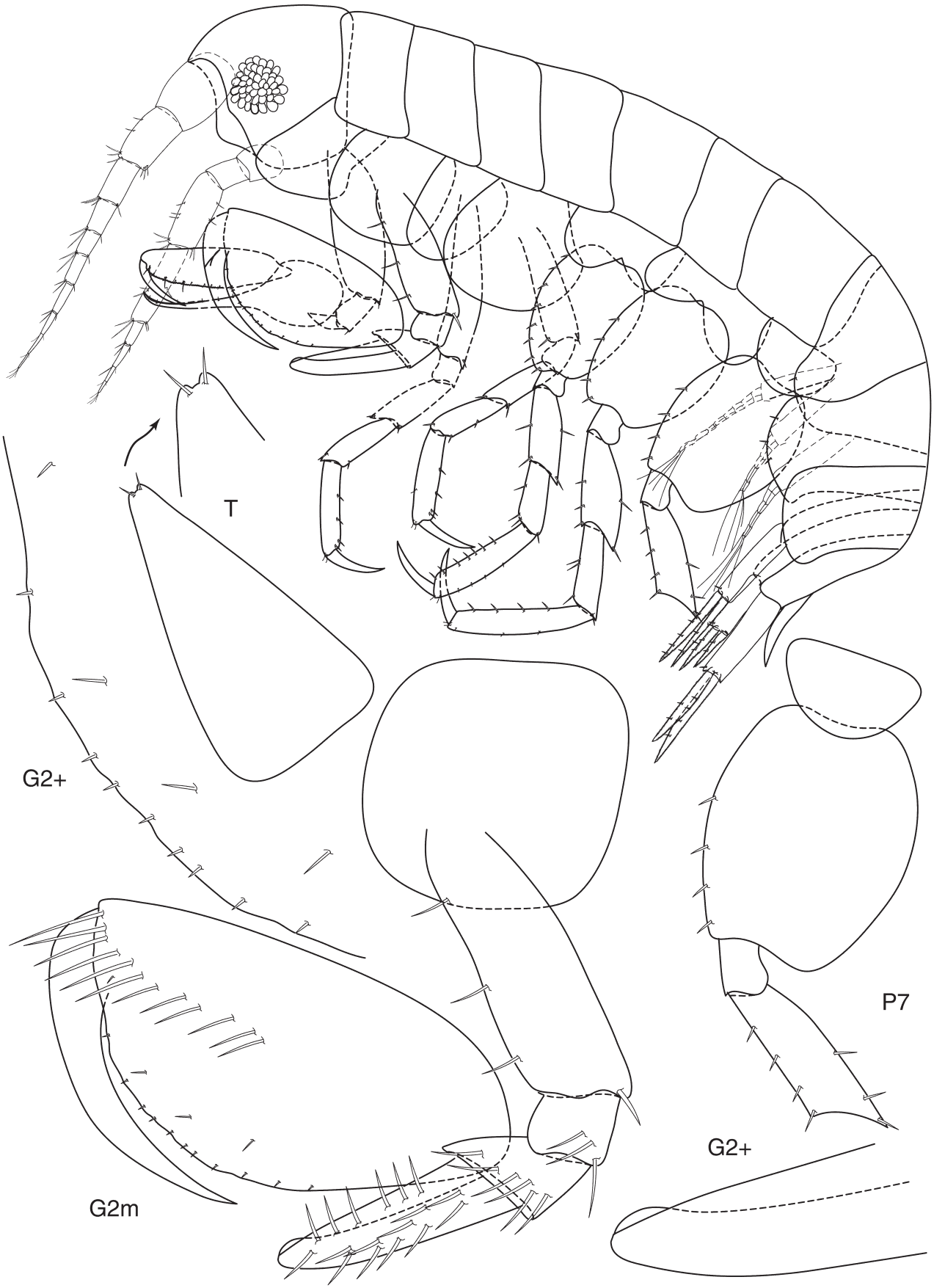

FIGURE 19. *Leucothoe pollexa* **sp. nov.**, holotype, male, 4.8 mm, AM P79815 (SEL/LZI-2-2), Picnic Beach, Palfrey Island, Great Barrier Reef; paratype, female, 4.9 mm, AM P79816 (SEL/LZI-5-1), Casuarina Beach. Lizard Island, Great Barrier Reef.

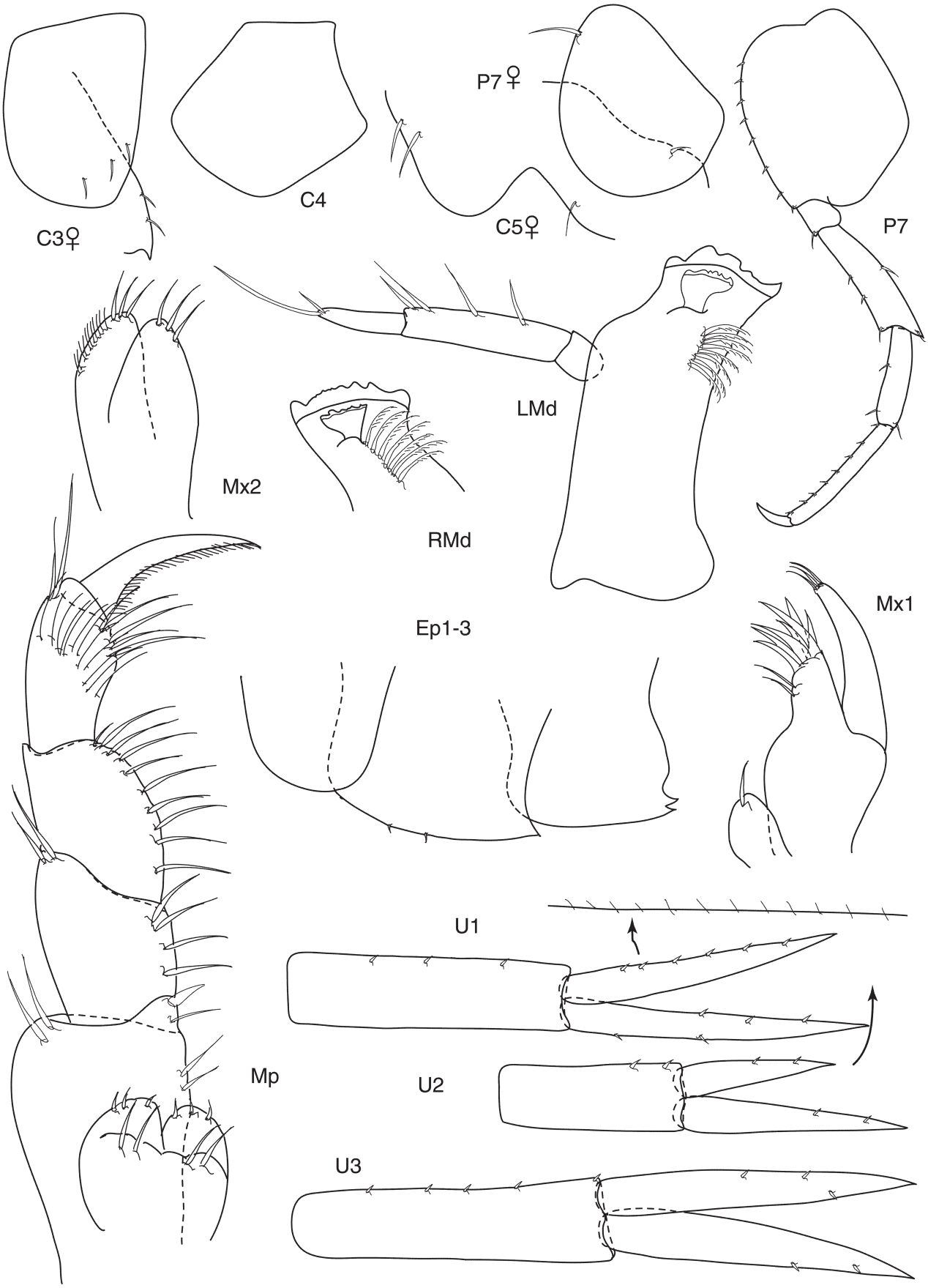

FIGURE 20. *Leucothoe pollexa* **sp. nov.**, holotype, male, 4.8 mm, AM P79815 (SEL/LZI-2-2), Picnic Beach, Palfrey Island, Great Barrier Reef; paratype, female, 4.9 mm, AM P79816 (SEL/LZI-5-1), Casuarina Beach. Lizard Island, Great Barrier Reef.

Pleon. *Epimera 1–3* bare. *Epimeron 2* with 2 ventral setae. *Epimeron 3* posteroventral margin with bidentate notch. *Uropods 1–3* relative lengths 1.0:0.7:1.1; inner and outer ramus lined with short setae, with robust setae. *Uropod 1* peduncle subequal in length with outer and inner ramus. *Uropod 2* peduncle 0.8 x inner ramus length; outer ramus 0.6 x inner ramus length. *Uropod 3* peduncle and outer ramus subequal to inner ramus length. *Telson* 2.7 x longer than wide, apex tridentate.

Female (sexually dimorphic characters). Based on paratype, female, 4.9 mm, AM P79816. *Gnathopod 1* basis anterior margin with 4–5 setae; ischium with 3 posterior setae. *Gnathopod* 2 basis with 5–8 anterior and 5–6 posterior setae; propodus palm projections less prominent; carpus distally truncate, without subdistal tooth. *Pereopods 3+5–7* coxa with facial setae. *Epimeron 1* with 2 anteroventral setae.

Habitat. In coral rubble and muddy sand from intertidal beach.

Remarks. *Leucothoe pollexa* **sp. nov.** shares its strongly recurved gnathopod 2 dactylus with *L. rudicula* **sp. nov.** The epimeron 3 bidentate notch is found in *Leucothoe alcyone* Imbach, 1967, *Leucothoe bidens* Hirayama, 1985c and *Leucothoe germanalcyone* Hirayama 1992a. *Leucothoe pollexa* shares its uni-articulate maxilla 1 palp with *L. hipposideros* **sp. nov.,** *L. laevipalma* **sp. nov.,** *L. odontiskos* **sp. nov.**, *L. sparsa* **sp. nov.**, *L. thula* **sp. nov.** and *L. undulata* **sp. nov**. This character has not been found in any described *Leucothoe* to date, although an "indistinct suture" in the maxilla 1 palp has been reported in *L. assimilis, L. basilobata*, *L. cheiriserra* and *L. urospinosa*. *Leucothoe pollexa* shares facial setae on the coxa with *L. epidemos* **sp. nov.**, *L. sparsa* and *L. thula Leucothoe pollexa* shares its gnathopod 2 carpus subdistal tooth with *L. assimilis, L. diemensis, Leucothoe furina* Savigny, 1816, *Leucothoe incisa* Stebbing 1897, *L. laticoxa, L. orkneyi* and *Leucothoe spinicarpa* (Abildgaard, 1789).

Distribution. *Australia*. Queensland: Lizard Island (current study).

***Leucothoe rudicula* sp. nov.**
(Figs 21, 22)

Type material. Holotype, male, 2.6 mm, AM P79801**;** North Point, Lizard Island (14°38'S 145°27'E), rubble sample from vertical cliffs and unconsolidated bottom rubble, 12.2 m, J.D. Thomas, 28 January 1989 (JDT/LIZ 13). Paratype, male, 2.3 mm, AM P79802, same station data. Paratype, female, 1.80 mm, AM P79803, same station data.

Additional material examined. 2 females, 1 male, AM P79804 (JDT/LIZ 13).

Type locality. North Point, Lizard Island, Queensland, Australia (14°38'S 145°27'E).

Etymology. After the Latin '*rudicula*', meaning 'wooden spoon, spatula' and referring to the spoon-like apex of the gnathopod 2 carpus.

Description. Based on holotype, male, 2.6 mm, AM P79801.

Head. *Head* length less than pereonite 1+2, anterior margin truncate, without serrations or teeth, anterodistal margin quadrate with cusp, ventral cephalic keel oblique, rostrum small to medium; eyes with 10 or more ocelli, round. *Antenna 1* 0.4 x body length; flagellum 7-articulate, peduncle width less than 2 x article 2. *Antenna 2* 0.3 x body length 0.3, shorter than antenna 1; flagellum 3-articulate. *Mandibles* lacking molars, palp 3-articulate, ratio of articles 1–3, 1.0:2.6:1.4, article 2 with 4 distal setae, article 3 with 2 distal setae, incisors strongly dentate; left mandible lacinia mobilis moderate in size, strongly toothed, with 8 accessory setae; right mandible lacinia mobilis small, with 8 accessory setae. *Upper lip* asymmetrically lobate, anterior margin weakly setose. *Lower lip* inner lobes fused, bare; outer lobes with moderate gape, anterior margins weakly setose. *Maxilla 1* palp 2-articulate with 4 distal setae; outer plate with 5 distal spines and 1 distal seta. *Maxilla 2* inner plate with 4 distal setae; outer plate with 3 robust and 10–12 thin distal setae. *Maxilliped* inner plates fused, distal margin with v-shaped indentation, with short spines and setae; outer plate smooth, reduced, reaching much less than half of palp article 1, with 4 distal setae and 1 distal spine; palp 4-articulate, article 4 widened proximally, slightly recurved.

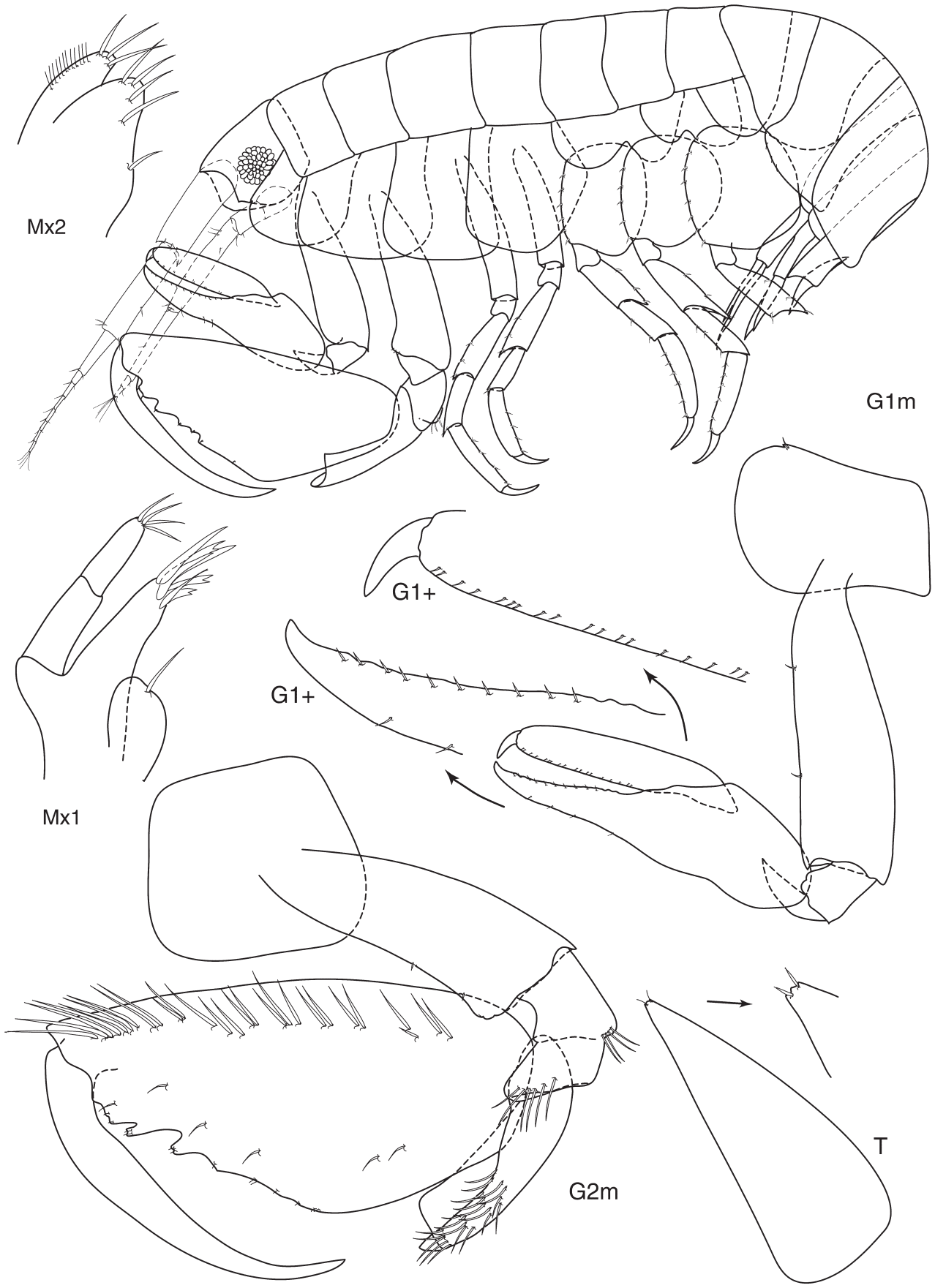

FIGURE 21. *Leucothoe rudicula* **sp. nov.**, holotype, male, 2.6 mm, AM P79801 (JDT/LIZ 13), North Point, Lizard Island, Great Barrier Reef.

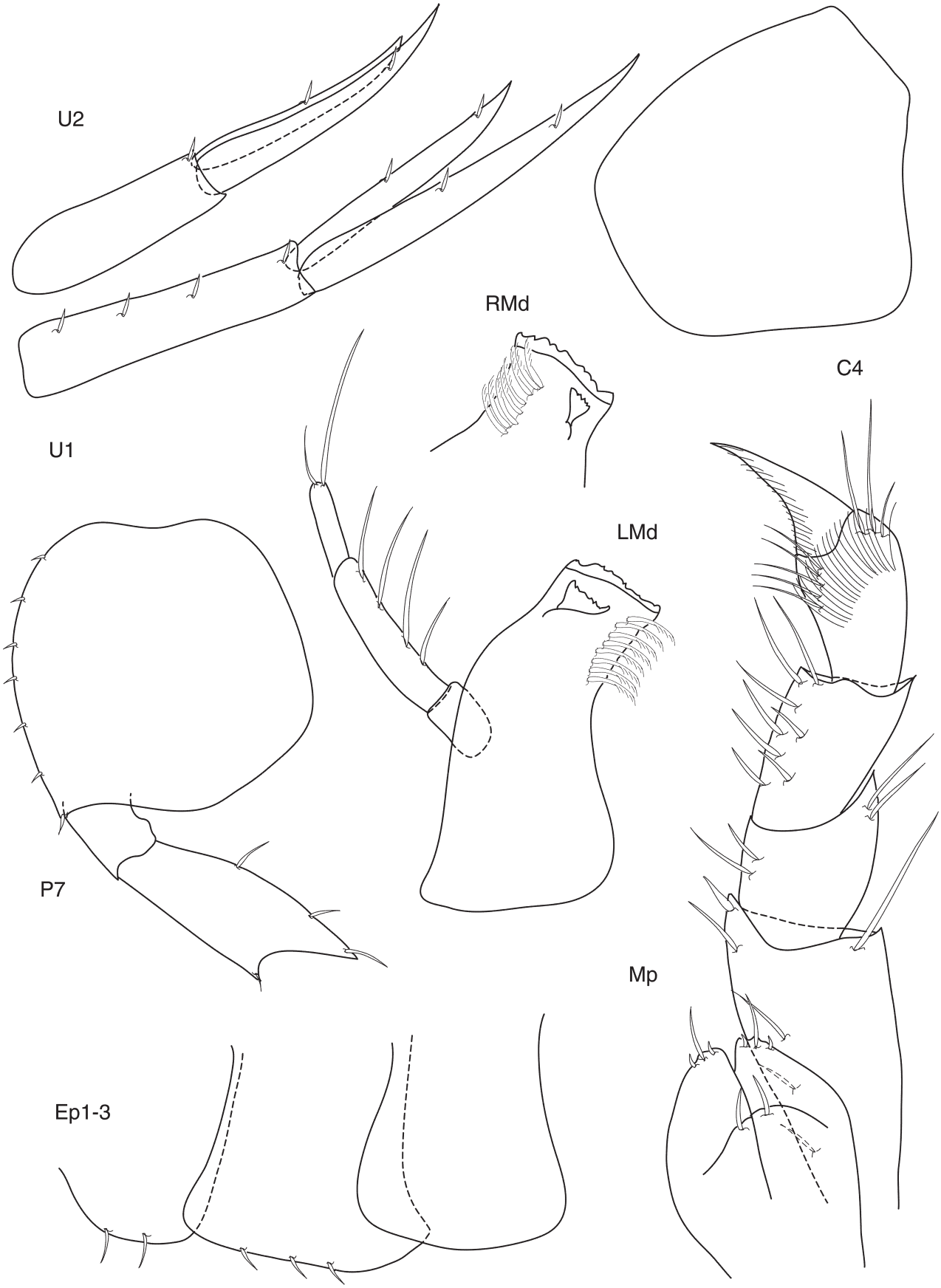

FIGURE 22. *Leucothoe rudicula* **sp. nov.**, holotype, male, 2.6 mm, AM P79801 (JDT/LIZ 13), North Point, Lizard Island, Great Barrier Reef.

Pereon. *Coxae 1–4* relative widths 1.0:1.7:1.5:1.8. *Gnathopod 1* coxa smooth, anterodistal corner produced, with 1 seta, broadly rounded, distal margin rounded, posterodistal margin rounded, facial setae absent; basis expanded distally, anterior margin with 2 short setae, posterior margin bare; ischium bare; carpus and propodus distally inflated, bulbous; carpus length 5.8 x width, proximal margin weakly serrate, distal margin setose; propodus straight, palm smooth with 18–20 distal setae; dactylus smooth, reaching 0.1 x propodus length. *Gnathopod 2* coxa length and width subequal, slightly wider than coxa 3, smooth, bare, anterodistally rounded, distal margin evenly rounded, posterior margin rounded, facial setae absent; basis anterodistal margin expanded, with 2 small tubercles, anterior margin with 2 setae, posterior margin bare; ischium with 4 posterodistal setae; carpus 0.4 x propodus length, recurved, distally truncate, spoon-like, anterior margin smooth; propodus posterior margin without teeth/serrations, with 2 mediofacial setal rows, primary mediofacial setal row above midline, reaching 0.8 x propodus length, secondary mediofacial setal row with 2 setae, 1 row of 3 submarginal setae, palm convex with 3 major projections; dactylus recurved, proximal margin smooth, tapered, anterior margin distally subacute, reaching 0.8 x propodus length. *Pereopod 3* coxa length 0.8 x width, anterodistal corner over-riding distal face of coxa 2 and extending below it, smooth, bare, anterior margin evenly rounded, distal margin straight, posterior margin straight, facial setae absent. *Pereopod 4* coxa smooth, bare, anterior margin subquadrate, distal margin produced, posterior margin weakly excavate, facial setae absent. *Pereopods 5–7* coxa facial setae absent; basis width length ratios 1:1.3, 1:1.0, 1:1.0, posterior margins smooth, bare.

Pleon. *Epimeron 1* with 2 ventral setae. *Epimeron 2* with 3 ventral setae. *Epimeron 3* bare, posteroventral margin subquadrate. *Uropod 3* missing. *Uropods 1–2* relative lengths 1.0:0.7; peduncle 0.7 x inner ramus length. *Uropod 1* outer ramus 0.7 x inner ramus length; inner and outer ramus with robust setae. *Uropod 2* outer ramus 0.8 x inner ramus length; inner and outer ramus with a single robust seta. *Telson* 2.5 x longer than wide, apex tridentate.

Female (sexually dimorphic characters). Based on paratype, female, 1.8 mm, AM P79803. *Gnathopod 1* carpus distal margin with 3 setae; basis anterior margin bare, posterior margin with 2 short setae. *Gnathopod 2* propodus mediofacial setal row with fewer setae. *Pereopods 5–6* coxa each with 2 proximal facial setae.

Habitat. Coral rubble from vertical cliffs and unconsolidated bottom rubble.

Remarks. *Leucothoe rudicula* **sp. nov.** appears to be very closely related to *L. lihue* based on the stout gnathopod 1 propodus, short gnathopod 1 dactylus length and the distinct convex gnathopod 2 propodus with 3 strong palmar projections. *Leucothoe lihue* differs from *L. rudicula* in its dense covering of setae on the maxilliped inner plates. *Leucothoe rudicula* shares its truncate, spoon-like gnathopod 2 carpus with *L. alata, L. lihue, L. spinulosa, L. tridens* and *Leucothoe epidemos* **sp. nov.** and its strongly recurved gnathopod 2 dactylus with *L. pollexa* **sp. nov.** *Leucothoe rudicula* shares its general gnathopod 1 shape with species in the genus *Paraleucothoe*; however, its propodus is much narrower than in *Paraleucothoe*. The strong dentition of the propodus palm of gnathopod 2 is shared with *L. ashleyae, L. hornelli, L. stegoceras*, *L. adelphe* **sp. nov.** and *L. serrata* **sp. nov.** but differs in most other respects, namely the short dactylus of gnathopod 1.

Distribution. *Australia*. Queensland: Lizard Island (current study).

***Leucothoe serrata* sp. nov.**
(Figs 23, 24)

Type material. Holotype, male, 2.4 mm, AM P79781, Half Mile Opening, Yonge Reef (14°34.333'S 145°36.866'E), *Spirastrella vagabunda* (sponge), channel between outer barrier reefs, amphipod sucking unit, 13 m, K. Klebba, 5 March 2005 (QLD 1822). Paratype, female, 3.1 mm, AM P79782; same station data.

Additional material examined. 1 male, AM P79291 (QLD 1643); 2 females, AM P71212 (QLD 1755); 1 female, AM P71253 (QLD 1775); 1 female, 1 male, AM P71443 (QLD 1820); 4 females, AM P71373 (QLD 1822).

Type locality. Yonge Reef, Lizard Island, Queensland, Australia (14°34.333'S 145°36.866'E).

Etymology. After the Latin '*serra*', meaning 'saw' and referring to the many serrate characters found in this species.

Description. Based on holotype, male, 2.4 mm, AM P79781.

Head. *Head* length less than pereonite 1+2, anterior margin truncate, without serrations or teeth, anterodistal margin quadrate with cusp, ventral cephalic keel quadrate, rostrum small to medium; eyes with 10 or more ocelli, round. *Antenna 1* 0.3 x body length; flagellum 6-articulate, peduncle width less than 2 x article 2. *Antenna 2* 0.2 x body length, shorter than antenna 1; flagellum 3-articulate. *Mandibles* lacking molars, palp 3-articulate, ratio of articles 1–3, 1.0:4.8:4.1, article 2 with 3–4 distal setae, article 3 with 2 distal setae, incisors strongly dentate; left mandible lacinia mobilis large, strongly toothed, with 8 accessory setae; right mandible lacinia mobilis small, with 8 accessory setae. *Upper lip* asymmetrically lobate, anterior margin setose. *Lower lip* inner lobes fused, bare; outer lobes with moderate gape, anterior margins weakly setose. *Maxilla 1* palp 2-articulate with 3 distal setae; outer plate with nine distal spines. *Maxilla 2* inner plate with 4 distal setae; outer plate with nine distal setae. *Maxilliped* inner plates fused, distal margin with v-shaped indentation, with short spines and long setae; outer plate serrate, reduced, reaching half of palp article 1, with 4 distal setae; palp 4-articulate, article 4 slender, slightly recurved.

Pereon. *Coxae 1–4* relative widths 1.0:2.0:1.4:2.0. *Gnathopod 1* coxa serrate, setose, anterodistal corner produced, subtriangular, distal margin straight, posterodistal margin subquadrate, facial setae absent; basis widened proximally, anterior margin with 4 setae, posterior margin with 4 setae; ischium bare; carpus and propodus distally tapered; carpus length 15.5 x width, proximal margin dentate, distal margin setose; propodus straight, palm smooth with proximal and distal dentition and nine distal setae; dactylus smooth, reaching 0.2 x propodus length. *Gnathopod 2* coxa length 1.2 x width, much wider than coxa 3, smooth, bare, anterodistally subquadrate, distal margin evenly rounded, posterior margin rounded, facial setae absent; basis constricted proximally, without tubercles or serrations, anterior margin with 8 setae, posterior margin with 5 setae; ischium with 5 posterior and 2 posterodistal setae; carpus 0.7 x propodus length, curved, distally tapered, anterior margin weakly serrate; propodus posterior margin without serrations/teeth, with 1 mediofacial setal row above midline, reaching 0.6 x propodus length, 1 row of 6 submarginal setae, palm convex with 7 major projections; dactylus curved, proximal margin smooth, anterior margin distally subacute, reaching 0.6 x propodus length. *Pereopod 3* coxa length 1.3 x width, anterodistal corner over-riding distal face of coxa 2 and extending below it, serrate, bare, anterior margin evenly rounded, distal margin slightly convex, posterior margin straight, facial setae absent. *Pereopod 4* coxa serrate, bare, anterior margin tapered, distal margin evenly rounded, posterior margin mildly excavate, facial setae absent. *Pereopods 5–7* coxa facial setae absent; basis l width length ratios 1:1.4, 1:1.3, 1:1.5, posterior margins serrate, bare.

Pleon. *Epimera 1–3* bare. *Epimeron 2* with 4 ventral setae. *Epimeron 3* posteroventral margin subquadrate. *Uropods 1–2* peduncle subequal to inner ramus length. *Uropods 1–3* relative lengths 1.0:0.8:0.8; inner and outer ramus with robust setae. *Uropod 1* peduncle with 2 rows of spines; outer and inner ramus subequal in length. *Uropod 2* outer ramus 0.8 x inner ramus length. *Uropod 3* peduncle 1.3 x inner ramus length; outer ramus subequal to inner ramus length. *Telson* 2.4 x longer than wide, with 2 proximal setae, apex tridentate.

Female (sexually dimorphic characters). No sexual dimorphism.

Habitat. In the sponge, *Spirastrella vagabunda* (Ridley, 1884) from a channel between outer barrier reefs.

Remarks. *Leucothoe serrata* **sp. nov.** shares its narrow gnathopod 1 propodus with *L. cheiriserra* and *L. gavialis* and the serrate maxilliped outer plate with *L. basilobata, L. cheiriserra, L. ctenochasma, L. laurensi, L. orkneyi, L. squalidens, L. hipposideros* **sp. nov.**, *L. laevipalma* **sp. nov.**, *L. odontiskos* **sp. nov.** and *L. undulata* **sp. nov.** The smooth gnathopod 1 propodus palm of *L. serrata* is similar to *L. flammosa*, *L. laevipalma* and *L. rudicula* **sp. nov.**, with the exception of the proximal and distal dentition in *L. serrata*. The serrate coxae of *L. serrata* are fairly unusual and shared only with *L. banwarthii, L. gracilis* and *L. makrommatos* **sp. nov.** The strong gnathopod 2 propodus palm dentition is shared with *L. ashleyae*, *L. hornelli*, *L. stegoceras*, *L. adelphe* **sp. nov.** and *L. rudicula*.

Distribution. *Australia*. Queensland: Lizard Island (current study).

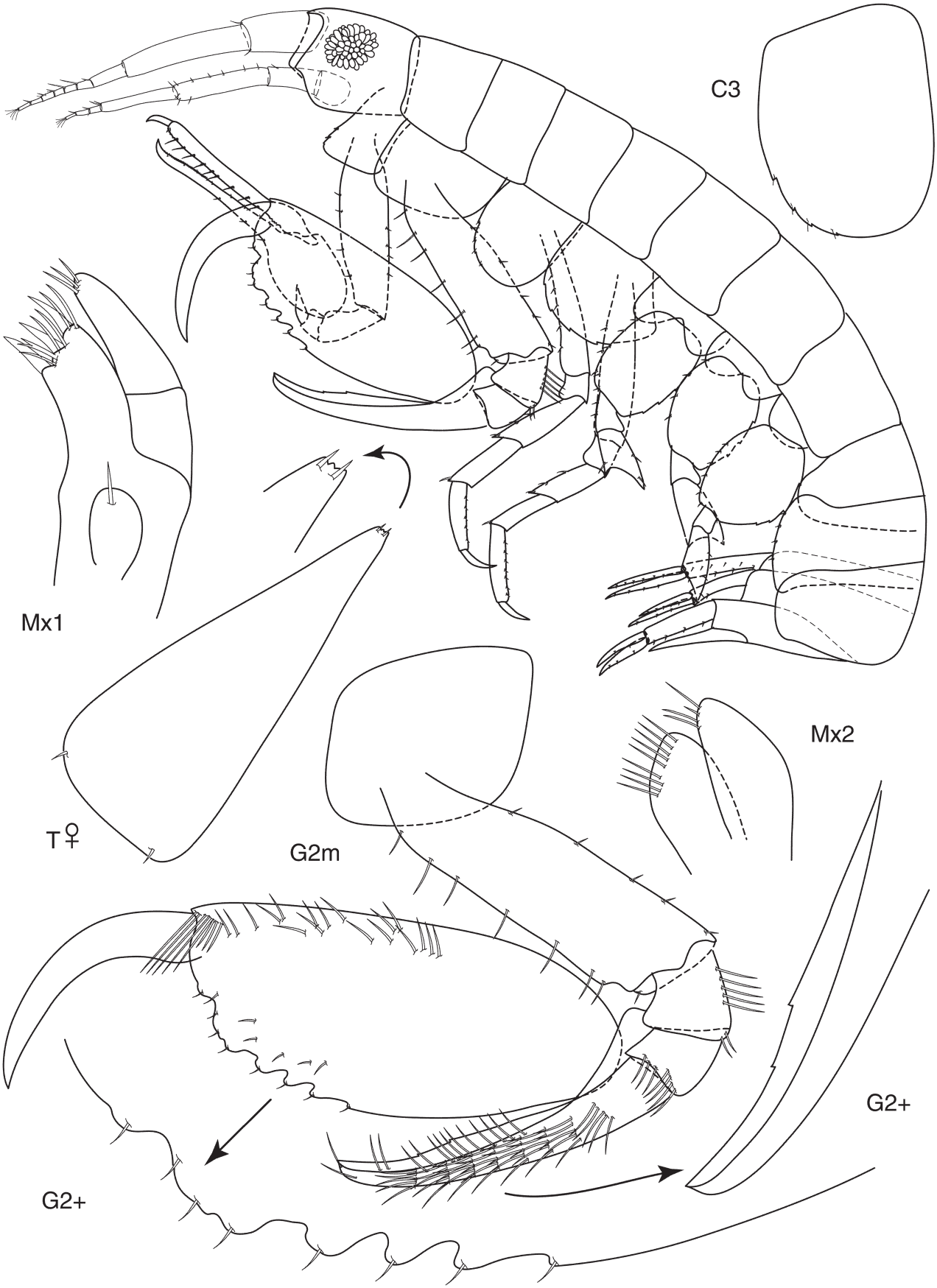

FIGURE 23. *Leucothoe serrata* **sp. nov.**, holotype, male, 2.4 mm, AM P79781; paratype, female, 3.14 mm, AM P79782 (QLD 1822), Half Mile Opening, Yonge Reef, Great Barrier Reef.

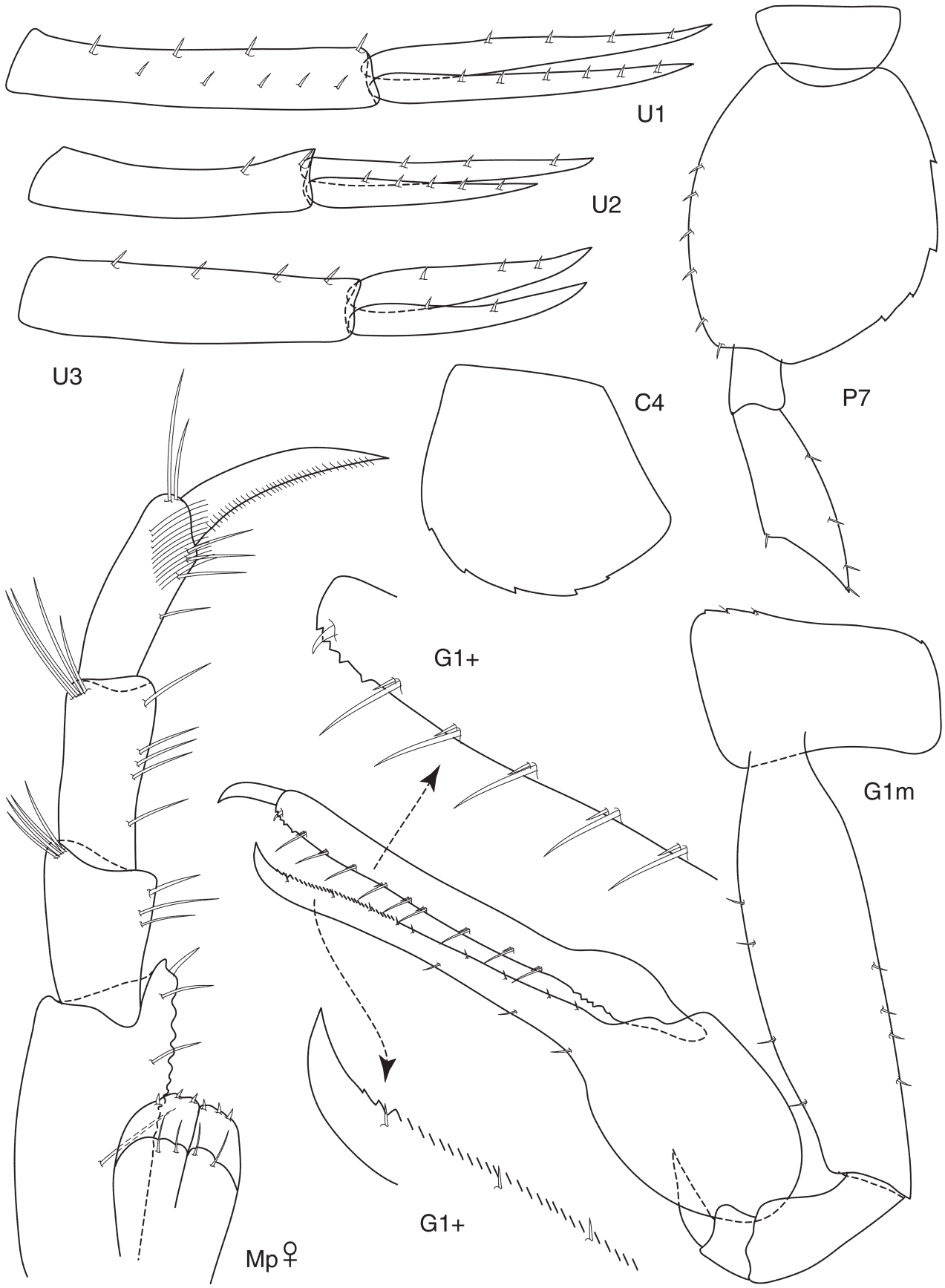

FIGURE 24. *Leucothoe serrata* **sp. nov.**, holotype, male, 2.4 mm, AM P79781; paratype, female, 3.14 mm, AM P79782 (QLD 1822), Half Mile Opening, Yonge Reef, Great Barrier Reef.

***Leucothoe sparsa* sp. nov.**
(Figs 25, 26)

Type material. Holotype, male, 2.9 mm, AM P71036, Picnic Beach, Palfrey Island, Lizard Island (14°41.69'S 145°26.89'E), algal mat and fine sediment from rubble bottom, reef flat, 3 m, S. LeCroy, 27 February 2005 (QLD 1708).

Type locality. Palfrey Island, Lizard Island, Queensland, Australia (14°41.69'S 145°26.89'E).

Etymology. After the Latin '*sparse*', meaning 'sprinkle' and referring to the sparse mediofacial setal row on the gnathopod 2 propodus.

Description. Based on holotype, male, 2.9 mm, AM P71036.

Head. *Head* length less than pereonite 1+2, anterior margin rounded, without serrations or teeth, anterodistal margin rounded without cusp, ventral cephalic keel rounded, rostrum small to medium; eyes with 10 or more ocelli, oval. *Antenna 1* 0.3 x body length; flagellum 6-articulate, peduncle width less than 2 x article 2. *Antenna 2* 0.3 x body length, longer than antenna 1; flagellum 4-articulate. *Mandibles* lacking molars, palp 3-articulate, ratio of articles 1–3, 1.0:2.8:2.0, article 2 with 2 distal and 3 proximal setae, article 3 with 2 distal setae, incisors strongly dentate; left mandible lacinia mobilis large, strongly toothed, with 8 accessory setae; right mandible lacinia mobilis small, with 8 accessory setae. *Upper lip* asymmetrically lobate, anterior margin setose. *Lower lip* inner lobes fused, bare; outer lobes with moderate gape, anterior margins weakly setose. *Maxilla 1* palp 1-articulate with 3 distal setae; outer plate with 6 distal spines and 3 thin distal setae. *Maxilla 2* inner plate with 3 robust and 5 thin distal setae; outer plate with 18 distal setae. *Maxilliped* inner plates fused, distal margin with v-shaped indentation, with short spines and long setae; outer plate smooth, reduced, reaching less than half of palp article 1, with 2 distal setae and 1 distal spine; palp 4-articulate, article 4 slender, slightly recurved.

Pereon. *Coxae 1–4* relative widths 1.0:1.1:0.9:1.5. *Gnathopod 1* coxa smooth, setose, anterodistal corner produced, truncated, distal margin straight, posterodistal margin rounded, facial setae absent; basis constricted proximally, anterior margin with 4 setae; posterior margin bare; ischium bare; carpus and propodus distally tapered; carpus length 7.2 x width, proximal margin serrate, distal margin setose; propodus straight, palm serrate with 4 distal setae; dactylus smooth, reaching 0.4 x propodus length. *Gnathopod 2* coxa length subequal to width, slightly wider than coxa 3, smooth, bare, anterodistally rounded, distal margin evenly rounded, posterior margin straight, facial setae absent; basis linear, without tubercles or serrations, anterior margin with 3 setae, posterior margin bare; ischium with 2 posterodistal setae; carpus 0.7 x propodus length, recurved, distally tapered, anterior margin weakly serrate; propodus posterior margin without teeth/serrations, with 1 sparse mediofacial setal row above midline, reaching 0.5 x propodus length, 1 row of 8 submarginal setae, palm convex with 3 minor projections; dactylus curved, proximal margin smooth, anterior margin distally subacute, reaching 0.7 x propodus length. *Pereopod 3* coxa length 1.6 x width, anterodistal corner over-riding distal face of coxa 2 and extending below it, smooth, setose, anterior margin evenly rounded, distal margin oblique, posterior margin slightly concave, facial setae absent. *Pereopod 4* coxa smooth, setose, anterior margin evenly rounded, distal margin evenly rounded, posterior margin tapered, facial setae absent. *Pereopods 5–7* coxa facial setae absent; basis length width ratio 1:0.9, posterior margins smooth. *Pereopod 5* basis posterior margin setose. *Pereopods 6–7* posterior margins bare.

Pleon. *Epimeron 1* with tuft of 4 anteroventral setae. *Epimeron 2* with 4 ventral setae. *Epimeron 3* bare, posteroventral corner subquadrate. *Uropods 1–3* relative lengths 1.0:0.7:1.1; peduncle and outer ramus subequal to inner ramus length; inner and outer ramus lined with short setae. *Uropod 1* inner ramus with robust setae, outer ramus without robust setae. *Uropod 2* peduncle and outer ramus 0.8 x inner ramus length. inner ramus with 1 robust seta; outer ramus without spines. *Uropod 3* inner and outer ramus with robust setae. *Telson* 1.9 x longer than wide, apex bidentate.

Female (sexually dimorphic characters). Unknown.

Habitat. In an algal mat and fine sediment from rubble bottom.

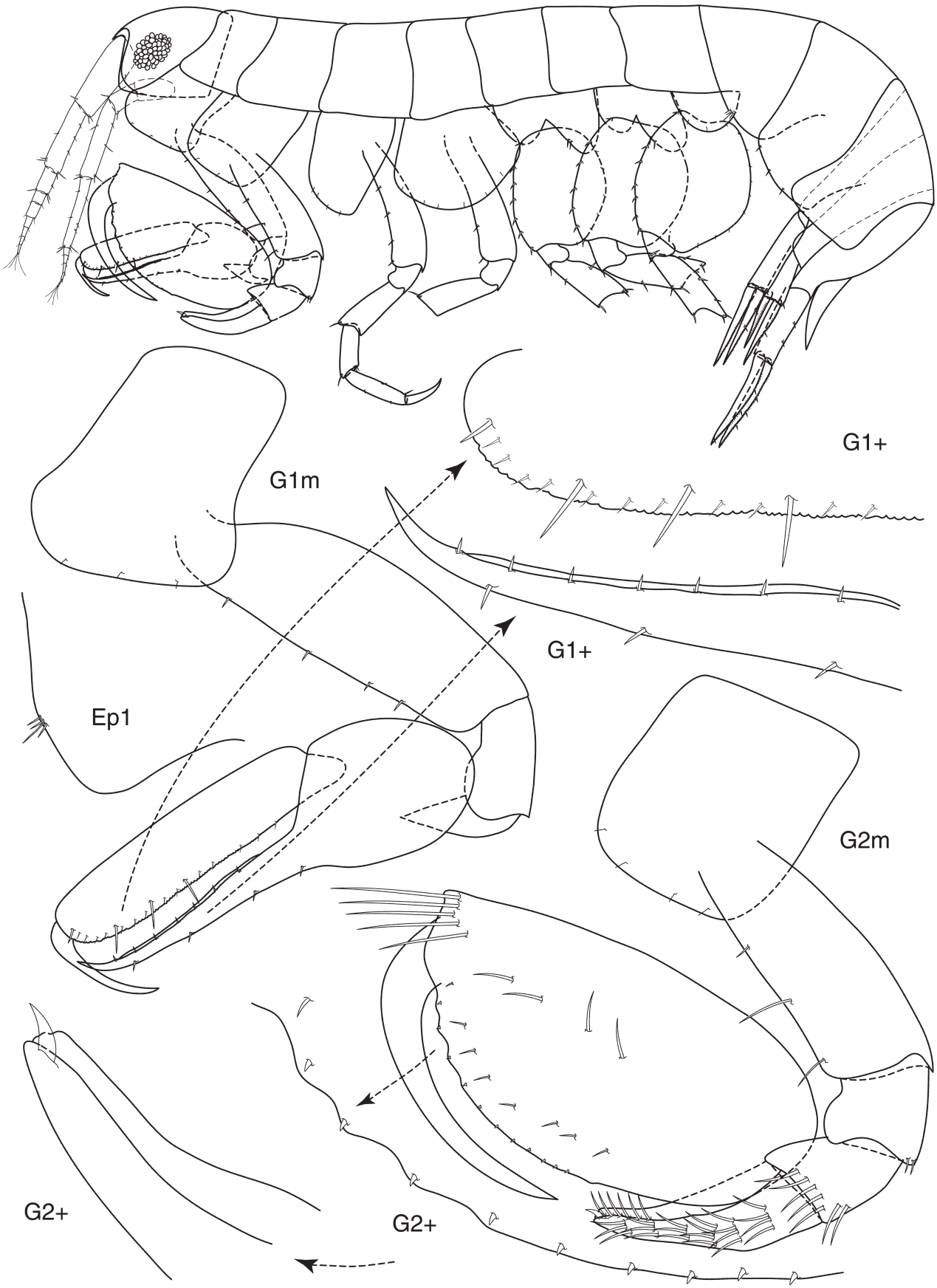

FIGURE 25. *Leucothoe sparsa* **sp. nov.**, holotype, male, 2.9 mm, AM P71036 (QLD 1708), Picnic Beach, Palfrey Island, Great Barrier Reef.

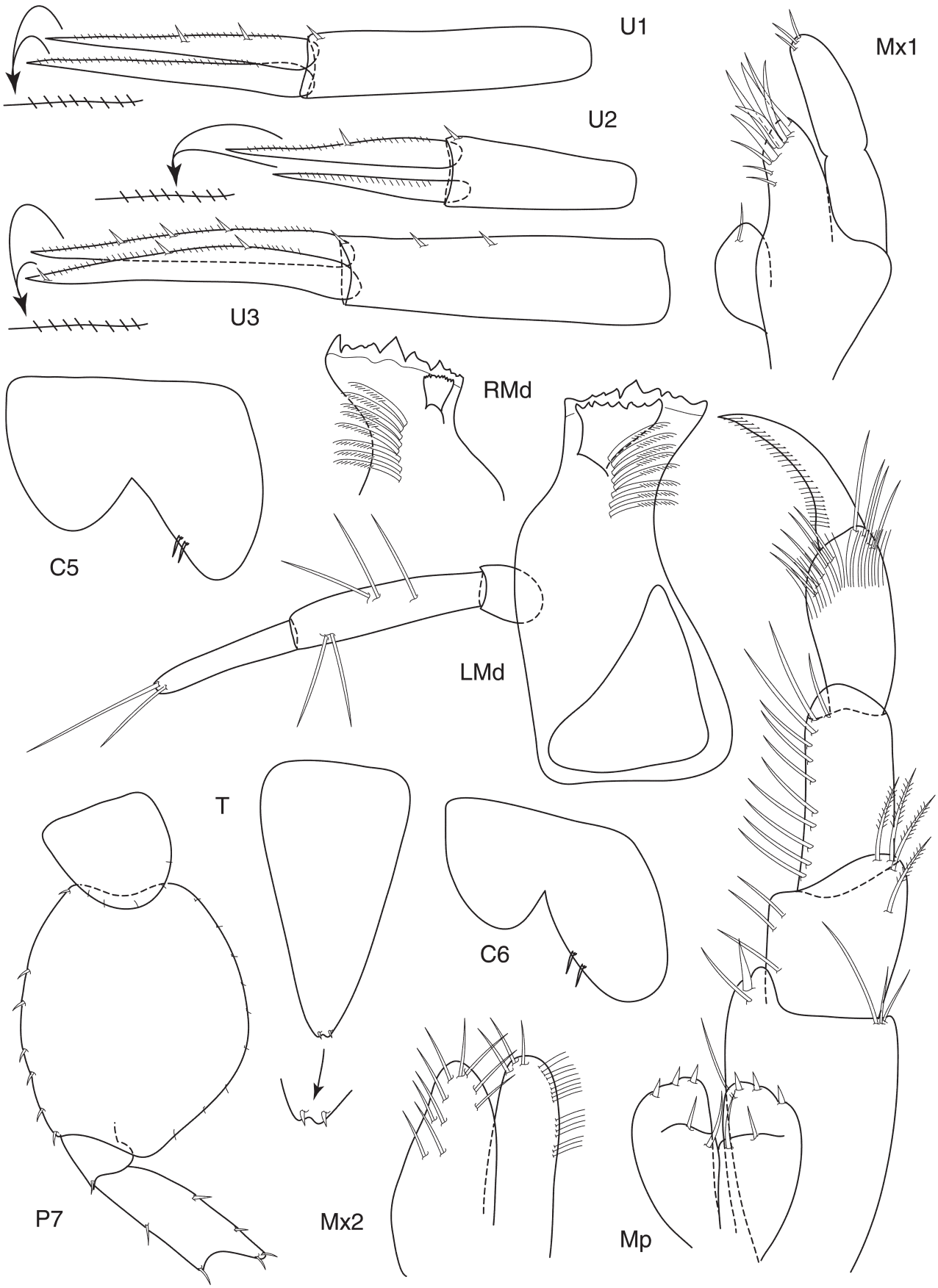

FIGURE 26. *Leucothoe sparsa* **sp. nov.**, holotype, male, 2.9 mm, AM P71036 (QLD 1708), Picnic Beach, Palfrey Island, Great Barrier Reef.

Remarks. *Leucothoe sparsa* **sp. nov.** has a distinctly sparse mediofacial setal row on gnathopod 2 propodus. The anterodistal tuft of epimeron 1 setae is shared with *L. alcyone*, *L. ashleyae*, *L. assimilis*, *L. bidens*, *L. furina*, *L. germanalcyone*, *L. saron* and *L. thula* **sp. nov.** The bidentate telson is also found in *L. basilobata*, *L. cheiriserra, L. commensalis*, *L. ctenochasma*, *L. diemensis*, *L. laticoxa* and *Leucothoe eumilli* **sp. nov.**

Distribution. *Australia*. Queensland: Lizard Island (current study).

***Leucothoe thula* sp. nov.**
(Figs 27, 28)

Type material. Holotype, male, 2.7 mm, AM P71122, 500 m north-east of North Point, Lizard Island (14°38.700'S 145°27.213'E), sponges, asteroid, solitary corals, hydroids, soft bottom with forams, crinoids, *Halimeda macroloba*, *Halimeda cylindracea*, *Caulerpa taxifolia*, *Gracilaria* sp., *Lobophora* sp. and sediment, 23 m, C. Serejo, 27 February 2005 (QLD 1710). Paratype, female, 3.2 mm, AM P79817, same station data.

Additional material examined. 1 female, AM P71022 (QLD 1709).

Type locality. North Point, Lizard Island, Queensland, Australia (14°38.700'S 145°27.213'E).

Etymology. After the Latin '*thule*', meaning 'farthest north' and referring to the type locality.

Description. Based on holotype, male, 2.7 mm, AM P71122.

Head. *Head* length less than pereonite 1+2, anterior margin rounded, without serrations or teeth, anterodistal margin rounded without cusp, ventral cephalic keel rounded, rostrum small to medium; eyes with 10 or more ocelli, distally concave. *Antenna 1* 0.3 x body length; flagellum 6-articulate, peduncle width less than 2 x article 2; article 3 shortened. *Antenna 2* 0.3 x body length, shorter than antenna 1; flagellum 4-articulate. *Mandibles* lacking molars, palp 3-articulate, ratio of articles 1–3, 1.0:2.5:1.4, article 2 with 6 distal setae, article 3 with 2 distal setae, incisors strongly dentate; left mandible lacinia mobilis large, strongly toothed, with 9 accessory setae; right mandible lacinia mobilis small, with 8 accessory setae. *Upper lip* asymmetrically lobate, anterior margin setose. *Lower lip* inner lobes fused, bare; outer lobes with moderate gape, anterior margins continually setose. *Maxilla 1* palp 1-articulate with 4 distal setae; outer plate with 6 distal spines and 3 distal setae. *Maxilla 2* inner plate with 3 robust setae and 8–10 thin distal setae; outer plate with 10–11 distal setae. *Maxilliped* inner plates fused, distal margin with v-shaped indentation, with short spines and long setae; outer plate smooth, reduced, reaching less than half of palp article 1, with 6 distal setae and 1 distal spine; palp 4-articulate, article 4 slender, very slightly curved.

Pereon. *Coxae 1–4* relative widths 1.0:0.8:0.7:1.4. *Gnathopod 1* coxa smooth, bare, anterodistal corner produced, subtriangular, distal margin rounded, posterodistal margin narrowly rounded, with 1 long facial seta; basis constricted proximally, anterior margin with 2–5 setae, posterior margin bare; ischium bare; carpus and propodus distally tapered; carpus 9.3 x longer than wide, proximal margin serrate, distal margin setose; propodus straight, palm serrate with 4 long and 10–15 short distal setae; dactylus smooth, reaching 0.3 x propodus length. *Gnathopod 2* coxa length 1.2 x width, slightly wider than coxa 3, smooth, bare, anterodistally rounded, distal margin evenly rounded, posterior margin straight, facial setae absent; basis constricted proximally, without tubercles or serrations, anterior margin with 5–8 setae, posterior margin bare; ischium with 1 posterior and 2 posterodistal setae; carpus 0.5 x propodus length, curved, distally tapered, anterior margin smooth; propodus posterior margin without teeth/serrations, with 1 mediofacial setal row below midline, reaching 0.8 x propodus length, 1 row of 7 submarginal setae, palm convex with 3 minor projections; dactylus recurved, proximal margin smooth, anterior margin distally acute, reaching 0.8 x propodus length. *Pereopod 3* coxa length 1.7 x width, anterodistal corner over-riding distal face of coxa 2 and extending below it, smooth, setose, anterior margin evenly rounded, distal margin tapered, posterior margin straight, with 3 facial setae. *Pereopod 4* coxa smooth, setose, anterior margin rounded, distal margin evenly rounded, posterior margin excavate, facial setae absent. *Pereopods 5–6* coxa each with 2 distal facial setae. *Pereopod 7* coxa facial setae absent. *Pereopods 6–7* missing. *Pereopod 5* basis width length ratio 1:1.3, posterior margin smooth, setose.

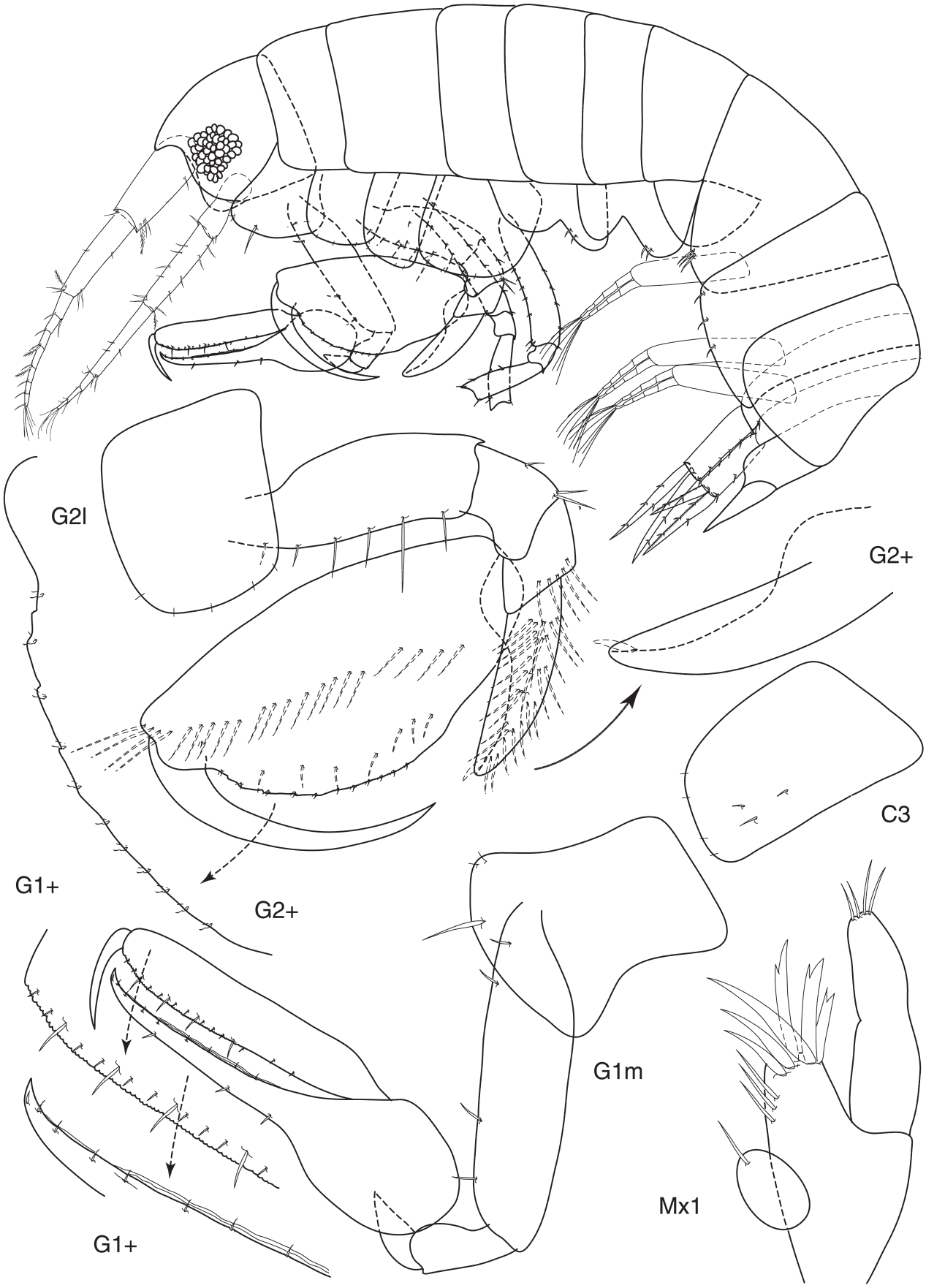

FIGURE 27. *Leucothoe thula* **sp. nov.**, holotype, male, 2.7 mm, AM P71122 (QLD 1710), North Point, Lizard Island, Great Barrier Reef.

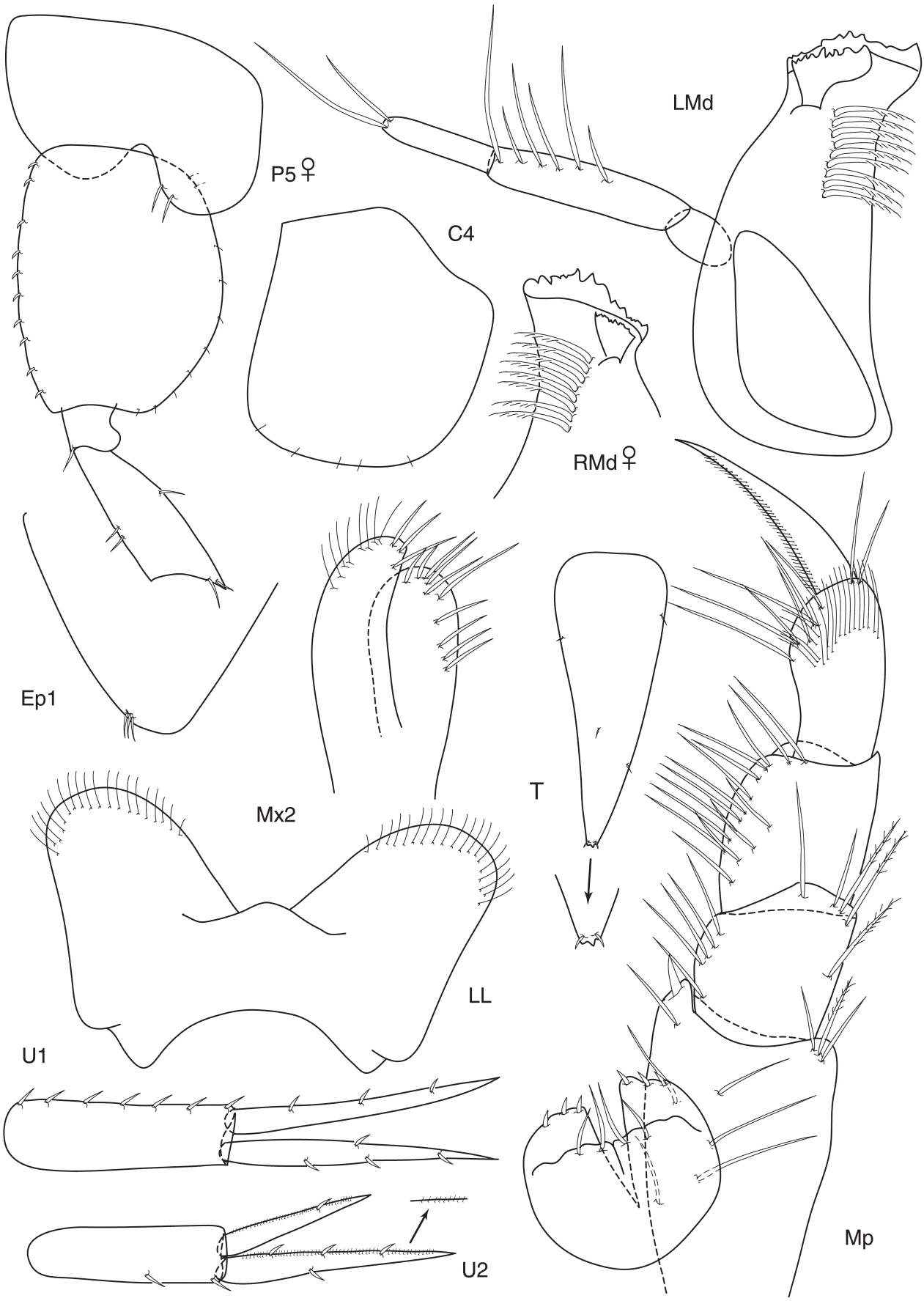

FIGURE 28. *Leucothoe thula* **sp. nov.**, holotype, male, 2.7 mm, AM P71122; paratype, female, 3.2 mm, AM P79817 (QLD 1710), North Point, Lizard Island, Great Barrier Reef.

Pleon. *Epimeron 1* with tuft of 3 anteroventral setae. *Epimeron 2* with 3 ventral setae. *Epimeron 3* bare, posteroventral margin subquadrate. *Uropods 1–2* subequal in length; inner and outer ramus lined with short marginal setae; peduncle 0.8 x inner ramus length. *Uropod 1* outer and inner ramus subequal in length; both rami with robust setae. *Uropod 2* outer ramus 0.7 x inner ramus length; inner ramus with robust setae; outer ramus with 1 robust seta. *Uropod 3* missing. *Telson* 2.6 x longer than wide, apex tridentate.

Female (sexually dimorphic characters). Based on paratype, female, 3.2 mm, AM P79817. *Epimera 1–2* bare. **Habitat.** In sponges, asteroid corals, solitary corals, hydroids, forams, crinoids, *Halimeda macroloba* Decaisne, 1841, *Halimeda cylindracea* Decaisne, 1842, *Caulerpa taxifolia* (Vahl, 1802), a species of *Gracilaria* Greville, 1830 and a species of *Lobophora* J. Agardh, 1894.

Remarks. *Leucothoe thula* **sp. nov.** shares its uni-articulate maxilla 1 palp with *L. hipposideros* **sp. nov.**, *L. laevipalma* **sp. nov.**, *L. odontiskos* **sp. nov.**, *L. pollexa* **sp. nov.**, *L. sparsa* **sp. nov.** and *L. undulata* **sp. nov**. This character has not been found in any described *Leucothoe* to date, although an "indistinct suture" in the maxilla 1 palp has been reported in *L. assimilis, L. basilobata*, *L. cheiriserra* and *L. urospinosa*. The anteroventral setal tuft on epimeron 1 is shared with *L. alcyone, L. ashleyae, L. assimilis*, *L. bidens, L. furina, L. germanalcyone*, *L. saron* and *L. sparsa*. The profusely displaced gnathopod 2 mediofacial setal row has only been recorded in *L. commensalis, L. wuriti* and *L. epidemos* **sp. nov.** to date. The facial and marginal setae on coxa 3 and 5 respectively are shared only with *L. epidemos*, *L. pollexa* and *L. sparsa*.

Distribution. *Australia*. Queensland: Lizard Island (current study).

***Leucothoe undulata* sp. nov.**
(Figs 29, 30)

Type material. Holotype, female, 3.2 mm, AM P80178. Pioneer Bay, Orpheus Island (~18°36'S 146°29'E), red encrusting sponge on reef, 2 m, K.N. Klebba, 27 May 2004 (JDT/OPH 27).

Type locality. Pioneer Bay, Orpheus Island, Queensland, Australia (~18°36'S 146°29'E).

Etymology. After the Latin '*undulatus*', meaning 'wavy' and referring to the undulating anterior margin of the gnathopod 2 carpus.

Description. Based on holotype, female, 3.2 mm, AM P80178.

Head. *Head* length less than pereonite 1+2, anterior margin rounded, without serrations or teeth, anterodistal margin rounded without cusp, ventral cephalic keel transverse, rostrum small to medium; eyes with 10 or more ocelli, round. *Antenna 1* 0.3 x body length; flagellum 6-articulate, peduncle width less than 2 x article 2. *Antenna 2* 0.2 x body length, shorter than antenna 1; flagellum 4-articulate. *Mandibles* lacking molars, palp 3-articulate, ratio of articles 1–3, 1.0:1.9:0.6, article 1 with a single seta, article 2 with 3 distal setae, article 3 with 2 distal setae, incisors strongly dentate; right mandible lacinia mobilis small, with nine accessory setae. *Upper lip* asymmetrically lobate, anterior margin setose. *Lower lip* inner lobes fused, bare; outer lobes with moderate gape, anterior margins weakly setose. *Maxilla 1* palp 1-articulate with 4 distal setae; outer plate with 7 distal spines. *Maxilla 2* inner plate with 3 distal setae; outer plate with nine distal setae. *Maxilliped* inner plates fused, distal margin with v-shaped indentation, with short spines; outer plate serrate, reduced, reaching less than half of palp article 1, with 5 distal setae and 1 distal spine; palp 4-articulate, article 4 wide, slightly recurved.

Pereon. *Coxae 1–4* relative widths 1.0:1.4:1.5:2.5. *Gnathopod 1* coxa smooth, setose, anterodistal corner not produced, narrowly rounded, distal margin rounded, posterodistal margin excavate, facial setae absent; basis constricted proximally, anterior margin bare, posterior margin with 11–20 short setae; ischium bare; carpus and propodus narrow, distally attenuated; carpus length 20 x width, proximal margin smooth, distal margin setose; propodus straight, palm dentate with nine distal setae; dactylus smooth, reaching 0.1 x propodus length. *Gnathopod 2* coxa length 0.9 x width, slightly wider than coxa 3, smooth, bare, anterodistally rounded, distal margin straight, posterior margin slightly concave, facial setae absent; basis constricted proximally, without tubercles or serrations, anterior margin with 15 setae, posterior margin with 12

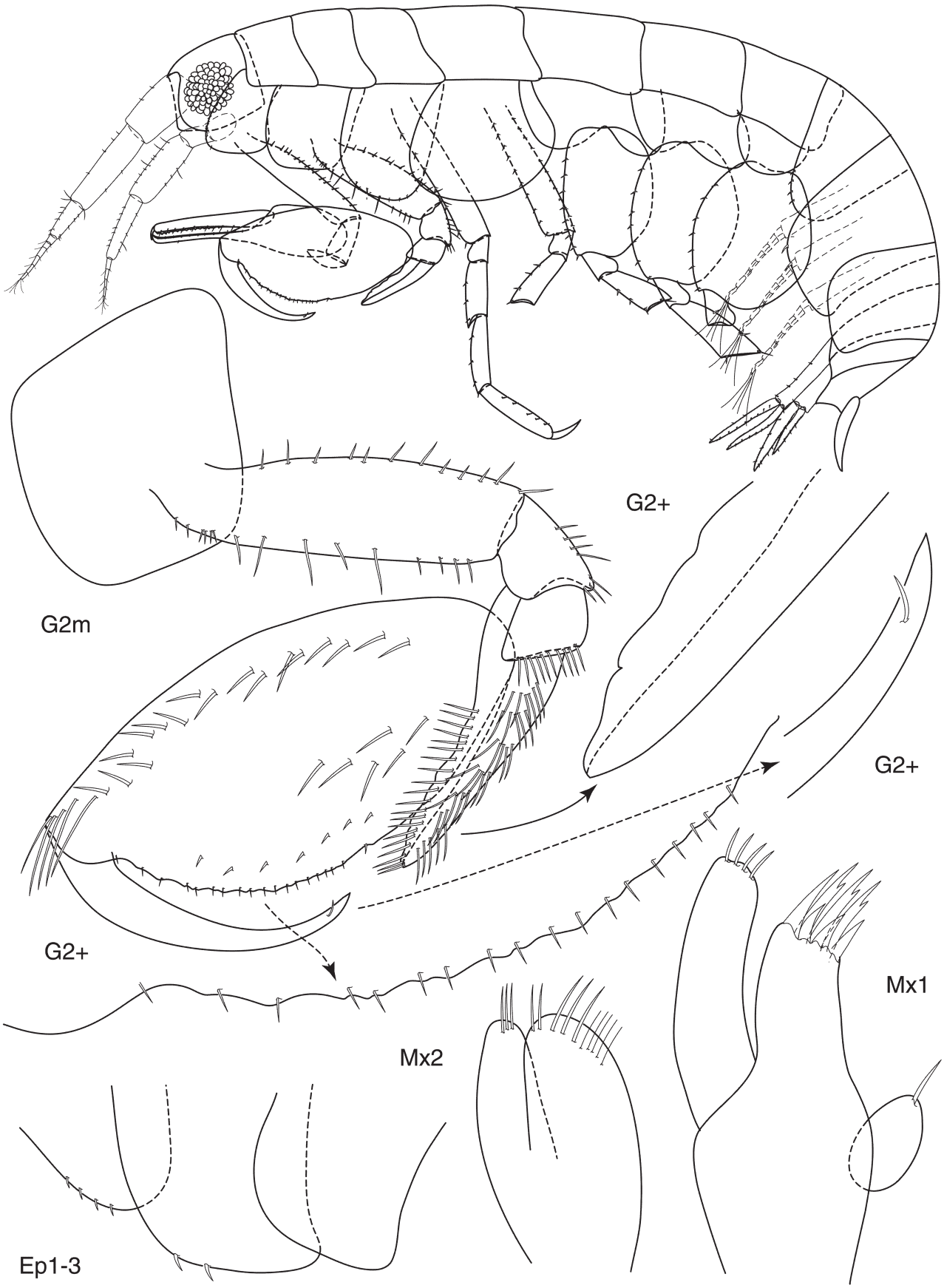

FIGURE 29. *Leucothoe undulata* **sp. nov.**, holotype, female, 3.2 mm, AM P80178 (JDT/OPH 27), Pioneer Bay, Orpheus Island, Great Barrier Reef.

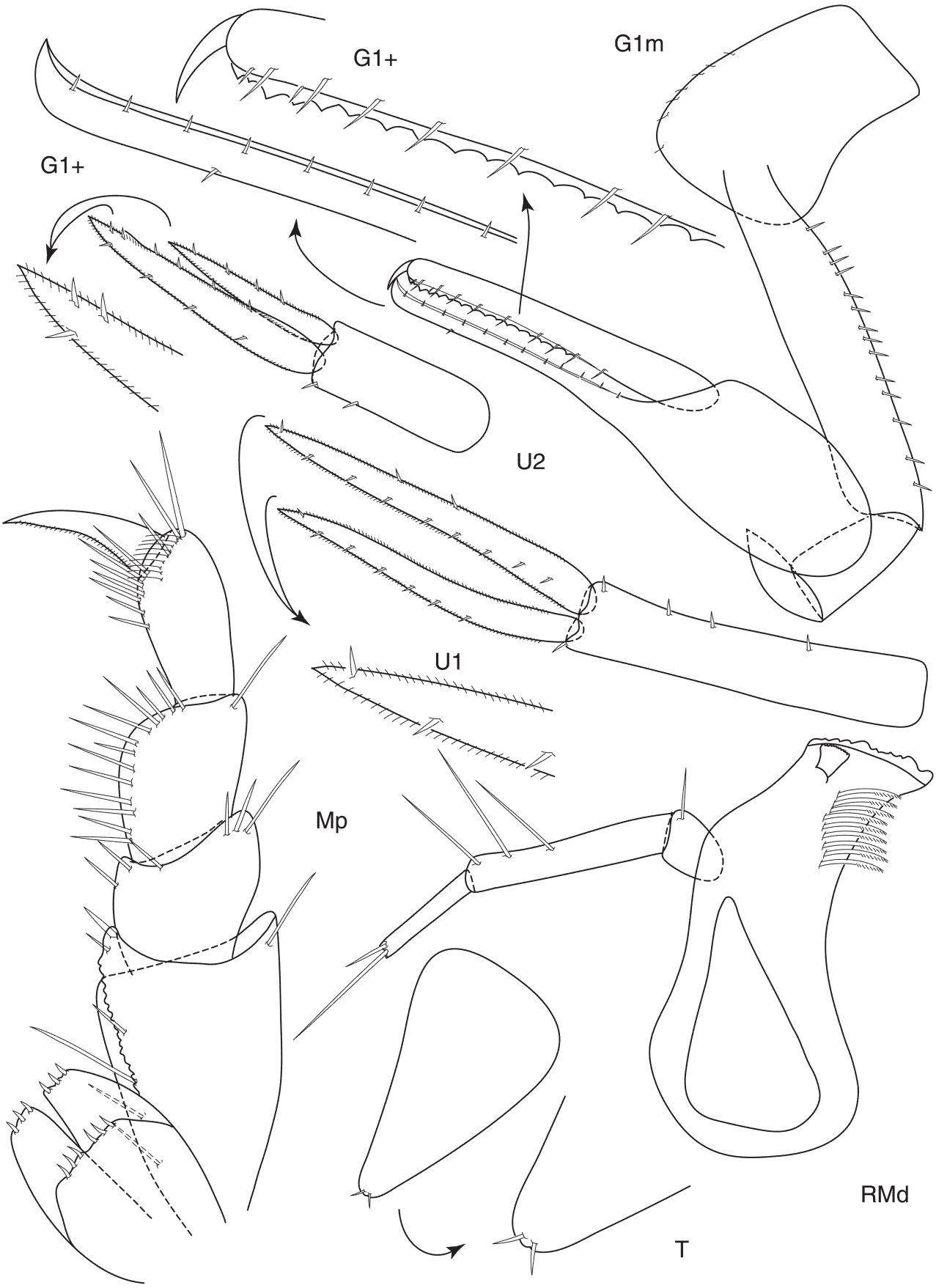

FIGURE 30. *Leucothoe undulata* **sp. nov.**, holotype, female, 3.2 mm, AM P80178 (JDT/OPH 27), Pioneer Bay, Orpheus Island, Great Barrier Reef.

setae; ischium with 4 posterior and 3 posterodistal setae; carpus 0.4 x propodus length, straight, distally tapered, anterior margin undulating; propodus posterior margin without teeth/serrations, with 2 mediofacial setal rows, primary mediofacial setal row above midline, reaching 0.8 x propodus length, secondary mediofacial setal row with 6 setae, 1 row of 7 submarginal setae; palm convex with several minor projections; dactylus recurved, proximal margin smooth with seta, anterior margin distally subacute, reaching 0.6 x propodus length. *Pereopod 3* coxa length 1.4 x width, anterodistal corner over-riding distal face of coxa 2 and extending below it, smooth, setose, anterior margin straight, distal margin slightly convex, posterior margin straight, facial setae absent. *Pereopod 4* coxa smooth, bare, anterior margin evenly rounded, distal margin evenly rounded, posterior margin excavate, facial setae absent. *Pereopods 5–7* coxa facial setae absent; basis width length ratios 1:1.4, 1:1.5, 1:1.2, posterior margins smooth, bare.

Pleon. *Epimeron 1* with 4 ventral setae. *Epimeron 2* with 2 ventral setae. *Epimeron 3* bare, posteroventral margin produced. *Uropod 1–2* relative lengths 1.0:0.6. *Uropod 1* peduncle subequal to inner ramus length; outer and inner ramus subequal in length. *Uropod 2* peduncle and outer ramus 0.7 x inner ramus length. *Uropod 1+2* inner and outer ramus lined with short marginal setae, with robust setae. *Uropod 3* missing. *Telson* 1.7 x longer than wide, apex tridentate.

Male (sexually dimorphic characters). Unknown.

Habitat. In red encrusting sponge from a patch reef.

Remarks. *Leucothoe undulata* **sp. nov.** shares its uni-articulate maxilla 1 palp with *L. hipposideros* **sp. nov**., *L. laevipalma* **sp. nov.**, *L. odontiskos* **sp. nov.**, *L. pollexa* **sp. nov.**, *L. sparsa* **sp. nov.** and *L. thula* **sp. nov.** This character has not been found in any described *Leucothoe* to date, although an "indistinct suture" in the maxilla 1 palp has been reported in *L. assimilis, L. basilobata*, *L. cheiriserra* and *L. urospinosa*. *Leucothoe undulata* **sp. nov.** shares its serrate maxilliped outer plate with *L. basilobata, L. cheiriserra*., *L. ctenochasma*, *L. laurensi*, *L. orkneyi*, *L. squalidens*, *L. hipposideros*, *L. laevipalma, L. odontiskos* and *L. serrata* **sp. nov.** *Leucothoe undulata* **sp. nov.** shares its dentate gnathopod 1 propodus palm with *L. ashleyae, L. basilobata*, *L. hipposideros* and *L. odontiskos*, but lacks the triangular teeth found in *L. hipposideros*. *Leucothoe undulata* is similar to *L. ashleyae,* females of *L. assimilis,* females of *L. banwarthii*, *L. barana, L. kensleyi*, *L. ubouhu, L. bova* **sp. nov.,** *L laevipalma, L. makrommatos* **sp. nov.** and *L. odontiskos* in its gnathopod 2 propodus secondary mediofacial setal row. The posterior setae on gnathopod 1 basis are shared with females of *L. saron*, *L. ubouhu* and *L. odontiskos*.

Distribution. *Australia*. Queensland: Orpheus Island (current study).

Leucothoella **Schellenberg, 1928**

Leucothoella gracilis **Haswell, 1879**
(Figs 31, 32)

Leucothoella gracilis Haswell, 1879: 263–264, pl. 10, fig. 2. —Haswell, 1882: 249. —Stebbing, 1906: 168. —J.L. Barnard, 1974: 99–102, figs 60–61. —Stebbing, 1910: 636. —Moore, 1987: 258. —Lowry & Stoddart, 2003: 156 (catalogue).

Material examined. 2 males, AM P79288 (JDT/LIZ 14); 8 males, 3 females, AM P79289 (JDT/LIZ 15); 6 males, 1 female, AM P79290 (JDT/LIZ 20); 1 male, AM P70886 (QLD 1693); 1 female, AM P70993 (QLD 1708); 1 male, 1 female, 1 juvenile, AM P71096 (QLD 1716); 1 male, 1 female, AM P71206 (QLD 1743); 2 males, AM P71226 (QLD 1775); 2 juveniles, AM P79287 (QLD 1775); 5 males, 1 female, AM P71375 (QLD 1875); 1 male, AM P71420 (QLD 1815); 1 juvenile, AM P71597 (QLD 1838); 1 female, GCRL2891 (SEL/LZI-2-4).

Type locality. Tasmania (~42ºS 147ºE).

Description. Based on male, 4.2 mm, AM P71375.

Head. *Head* length less than pereonite 1+2, anterior margin rounded, without serrations or teeth, anterodistal margin quadrate with cusp, ventral cephalic keel with projection, rostrum small to medium; eyes with 10 or more ocelli, round. *Antenna 1* 0.4 x body length; flagellum 7-articulate, peduncle width less than 2 x article 2. *Antenna 2* 0.4 x body length, shorter than antenna 1; flagellum 4-articulate. *Mandibles* lacking molars, palp 3-articulate, ratio of articles 1–3, 1.0:3.2:2.1, article 2 with 2–3 distal setae, article 3 with 2 distal setae, incisors weakly dentate; left mandible lacinia mobilis large, strongly toothed, with 7 accessory setae; right mandible lacinia mobilis small, with 8 accessory setae. *Upper lip* asymmetrically lobate, anterior margin setose. *Lower lip* inner lobes fused, weakly setose; outer lobes with moderate gape, anterior margins strongly setose. *Maxilla 1* palp 2-articulate with 4 distal setae; outer plate with 5 distal spines and 3 distal setae. *Maxilla 2* inner plate with 5 robust and 12–16 thin distal setae; outer plate with 7 distal and 3 proximal setae. *Maxilliped* inner plates fused, distal margin with v-shaped indentation, with short spines and long setae; outer plate smooth, vestigial, barely exceeding margin of palp article 1, with 5 distal setae, proximal margin lined with short setae; palp 4-articulate, article 4 slender, strongly recurved.

Pereon. *Coxae 1–4* relative widths 1.0:1.6:1.0:1.2. *Gnathopod 1* coxa serrate, setose, anterodistal corner not produced, subtriangular, distal margin straight, posterodistal margin straight, facial setae absent; basis constricted proximally, anterior margin with 5–6 setae, posterior margin with 7 short setae; ischium bare; carpus and propodus distally tapered; carpus 0.1 x longer than wide, proximal margin serrate, distal margin bare; propodus straight, palm serrate with 5 distal setae; dactylus smooth, reaching 0.5 x propodus length. *Gnathopod 2* coxa length 0.5 x width, much wider than coxa 3, serrate, setose, anterodistally acute, distal margin oblique, posterior margin subquadrate, facial setae absent; basis linear, without tubercles or serrations, anterior margin with 9–10 setae, posterior margin with 5–6 setae; ischium with 2 posterior setae; carpus 0.5 x propodus length, curved, distally truncate, anterior margin smooth; propodus posterior margin without teeth/serrations, with 2 mediofacial setal rows, primary mediofacial setal row above midline, reaching 0.5 x propodus length, secondary mediofacial setal row with 2 setae, 1 row of 7 submarginal setae, palm convex with 3 major projections; dactylus curved, proximal margin smooth, anterior margin distally subacute, reaching 0.6 x propodus length. *Pereopod 3* coxa length 0.6 x width, anterodistal corner over-riding distal face of coxa 2, not extending below it, serrate, setose, anterior margin rounded, distal margin straight, posterior margin straight, facial setae absent. *Pereopod 4* coxa serrate, setose, anterior margin straight, distal margin straight, posterior margin straight, facial setae absent. *Pereopods 5–7* coxa facial setae absent; basis width length ratios 1:3.0, 1:2.5, 1:2.5, posterior margins smooth, bare.

Pleon. *Epimera 1–3* bare. *Epimeron 3* posteroventral margin subquadrate. *Uropods 1–3* relative lengths 1.0:0.8:0.9; inner and outer ramus lined with short marginal setae. *Uropod 1* peduncle and inner ramus subequal in length; outer ramus subequal in length with inner ramus. *Uropod 2* peduncle 0.8 x inner ramus length; outer ramus 0.6 x inner ramus length; inner ramus with 1 robust seta; outer ramus with robust setae. *Uropod 3* peduncle 1.4 x inner ramus length; outer ramus 0.7 x inner ramus length; outer ramus with distal row of serrations. *Uropod 1+3* with robust setae. *Telson* 2.1 x longer than wide, apex tridentate, with 2 plumose distal setae.

Female (sexually dimorphic characters). Based on female, 3.5 mm, AM P71096. *Gnathopod 2* propodus with fewer mediofacial setae, secondary mediofacial setal row with 4 setae, 1 row of 8 submarginal setae; dactylus with apical protuberance.

Habitat. In sponges and calcareous algae.

Remarks. *Leucothoella gracilis* is distinct in its serrate, acute coxae 1–4 margins, extremely narrow pereopods 5–7 basis, setose spines on pereopods 5–7 carpus and plumose distal setae on the telson. The specimens described here differ from previous reports of this species due to the setose proximal margins of the maxilliped outer plates. Females of *L. gracilis* have a secondary mediofacial setal row similar to *L. ashleyae,* females of *L. assimilis*, *L. barana, L. kensleyi*, *L. ubouhu*, *L. bova* **sp. nov.,** *L. laevipalma* **sp. nov.***, L. makrommatos* **sp. nov.***, L. odontiskos* **sp. nov.** and *L. undulata* **sp. nov.**

Distribution. *Australia*. Queensland: Yonge Reef; Lizard Island; One Tree Island (current study). New South Wales: Victoria (J.L. Barnard 1974). South Australia: Port Phillip Bay (J.L. Barnard 1974). West Australia: north to Cape Naturaliste (J.L. Barnard 1974); Tasmania (Haswell 1879, Moore 1987).

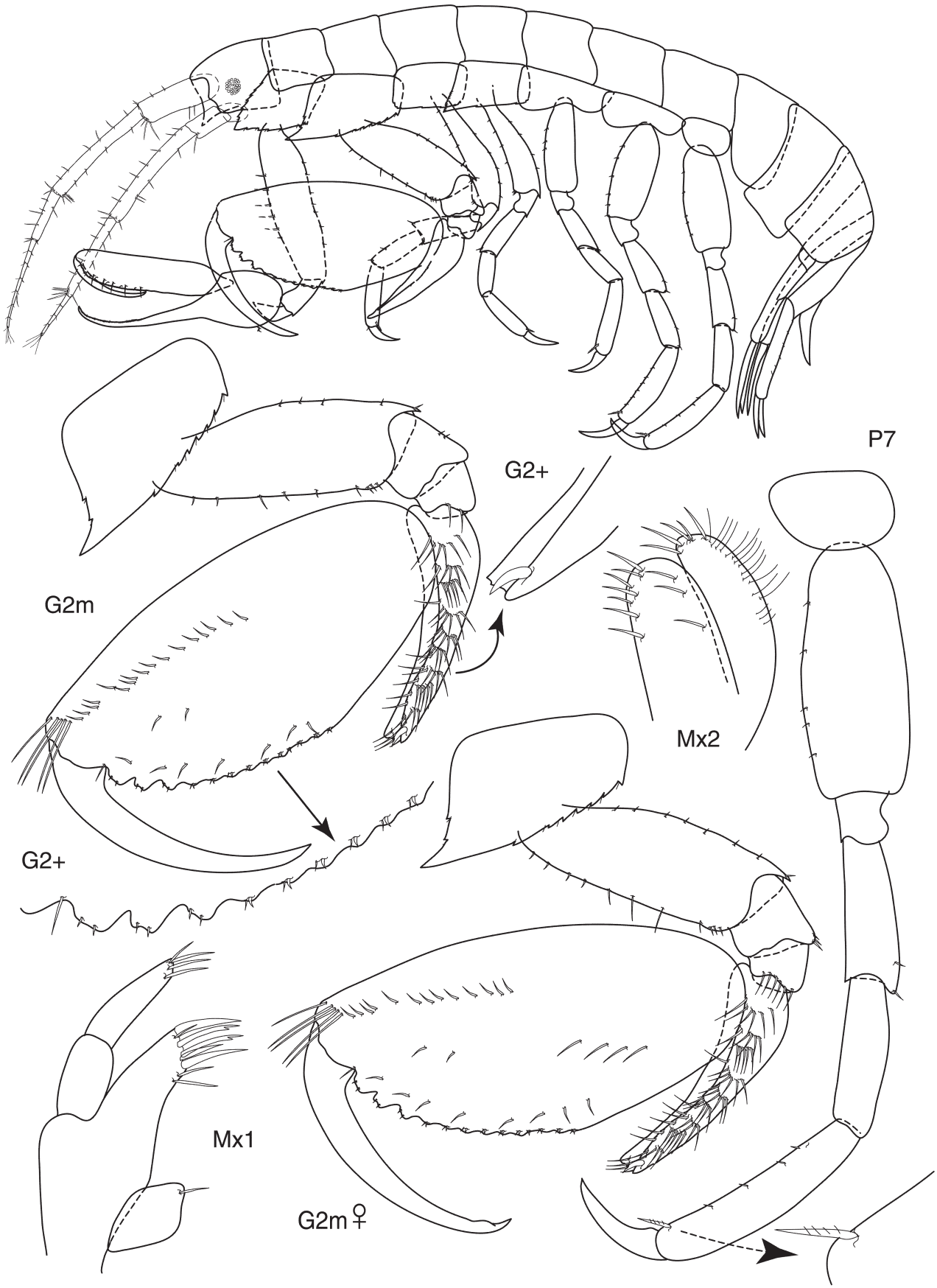

FIGURE 31. *Leucothoella gracilis* (Haswell, 1879), male, 4.2 mm, AM P71375; female, 3.5 mm (QLD 1716), Picnic Beach, Palfrey Island, Great Barrier Reef.

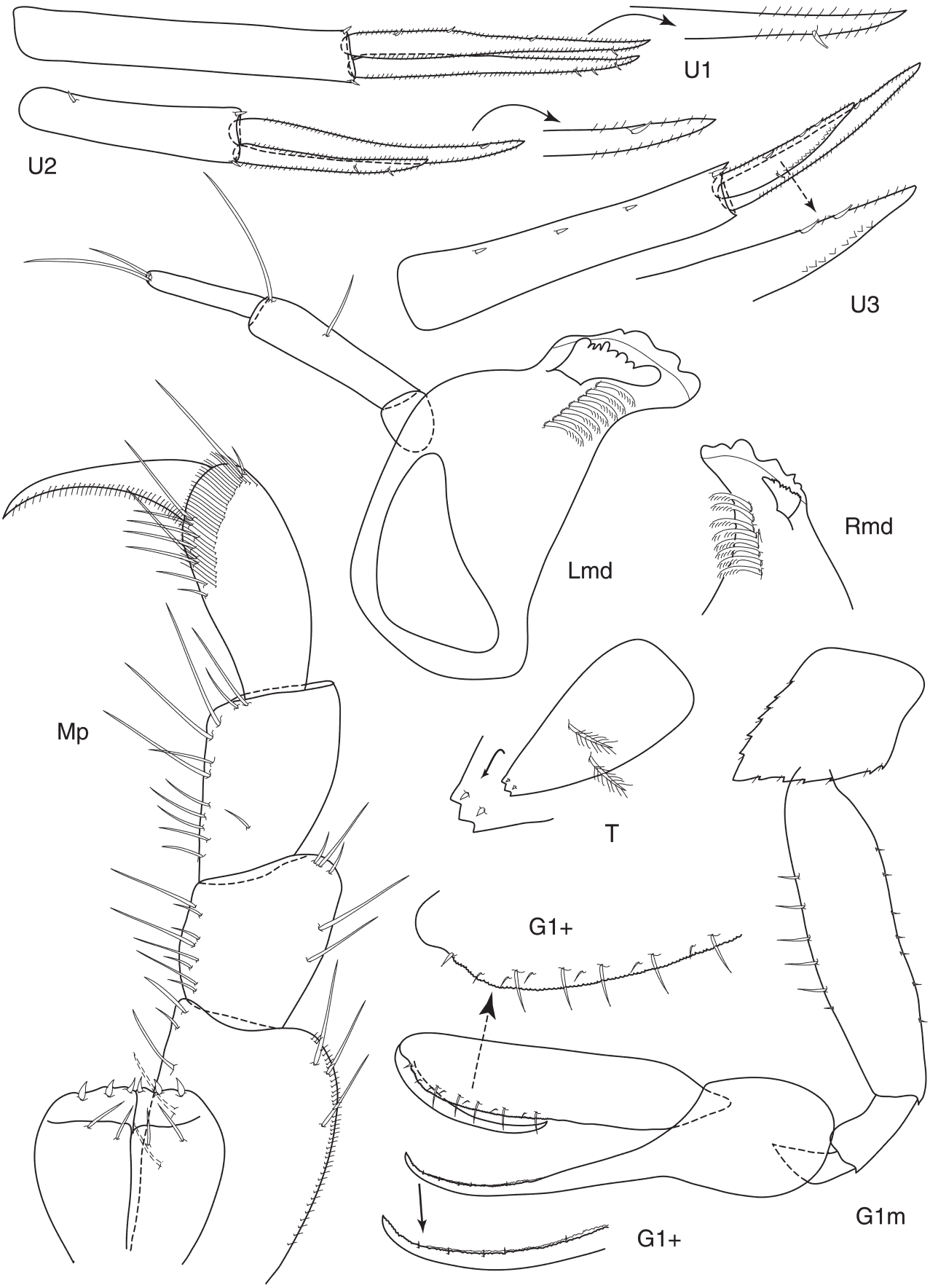

FIGURE 32. *Leucothoella gracilis* (Haswell, 1879), male, 4.2 mm, AM P71375; female, 3.5 mm (QLD 1716), Picnic Beach, Palfrey Island, Great Barrier Reef.

***Paranamixis* Schellenberg, 1928**

***Paranamixis jiigurru* sp. nov.**
(Figs 33, 34)

Type material. Holotype, male, 2.7 mm, AM P79818; Picnic Beach, Palfrey Island, Lizard Island (14°41.70'S 145°26.92'E), subtidal, patch reef, rubble patch with sand bottom, 2 m, S.E. LeCroy, 3 July 2001 (SEL/LZI-2-1).

Type locality. Palfrey Island, Lizard Island, Queensland, Australia (14°41.70'S 145°26.92'E).

Etymology. After the native Dingaal Aboriginal word, '*Jiigurru*', meaning '*Lizard Island*' and referring to the type locality. The Dingaal tribe believed that the Lizard Island group was created in the dreamtime and saw it as a stingray, with Lizard Island forming the body and Palfrey Island forming part of the tail.

Description. Based on holotype, male, 2.7 mm (anamorph), AM P79818.

Head. *Head* length less than pereonite 1+2, anterior margin truncate, without serrations or teeth, anterodistal margin quadrate with cusp; head defined by 1 acute tooth, ventral cephalic keel oblique, rostrum small to medium; eyes with 10 or more ocelli, round. *Antenna 1* 0.4 x body length; flagellum 7-articulate, peduncle width more than 2 x article 2. *Antenna 2* 0.3 x body length, shorter than antenna 1; flagellum 3-articulate. *Maxilliped* inner plates fused, distally rounded; outer plate smooth, lacking inner lobes; palp 4 articulate, palp article 4 elongate, slender, strongly recurved.

Pereon. *Coxae 1–4* relative widths 1.0:2.2:1.3:2.0. *Gnathopod 1* coxa reduced, smooth, bare, anterodistal corner produced, subtriangular, distal margin oblique, posterodistal margin subquadrate. *Gnathopod 1* absent. *Gnathopod 2* coxa length subequal to width, much wider than coxa 3, smooth, bare, anterodistally acute, distal margin convex with a rounded mid-distal projection, posterior margin tapered, facial setae absent; basis widened anterodistally, without tubercles or serrations, anterior and posterior margins bare; ischium bare; carpus 0.8 x propodus length, recurved, distally tapered, anterior margin smooth; propodus posterior margin concave, without teeth/serrations, with 1 mediofacial setal row displaced to midline, reaching 0.4 x propodus length, 1 row of 7 submarginal setae, palm convex, posteroproximal process absent, proximal margin extending past insertion of carpus; dactylus recurved, proximal margin smooth with 1 tubercle and 2 setae, anterior margin distally acute, reaching 0.6 x propodus length. *Pereopod 3* coxa length 1.2 x width, anterodistal corner over-riding distal face of coxa 2 and extending below it, smooth, bare, anterior margin subquadrate, distal margin slightly convex, posterior margin straight, facial setae absent. *Pereopod 4* coxa smooth, bare, anterior margin rounded, distal margin evenly rounded, posterior margin excavate, facial setae absent. *Pereopods 5–7* coxa facial setae absent; basis length width ratios 1:1.0, 1:1.1, 1:1.2, posterior margins smooth, bare.

Pleon. *Epimera 1–3* bare. *Epimeron 3* posteroventral corner narrowly rounded. *Uropods 1–3* relative lengths 1.0:0.8:1.2; inner and outer ramus with robust setae. *Uropod 1* peduncle 0.6 x inner ramus length; outer ramus 0.7 x inner ramus length. *Uropod 2* peduncle 0.5 x inner ramus length; outer ramus 0.6 x inner ramus length. *Uropod 3* peduncle 1.3 x inner ramus length; outer ramus 0.8 x inner ramus length. *Telson* 1.3 x longer than wide, apex entire.

Female. (sexually dimorphic characters). Leucomorphs unknown.

Habitat. In coral rubble from a subtidal patch reef.

Remarks. *Paranamixis jiigurru* **sp. nov.** is similar to *Paranamixis fijiensis* Thomas, 1997, the only other species of *Paranamixis* with fused inner plates on the maxilliped. According to Thomas (1997) this character may suggest that these are actually species of *Anamixis* that have lost gnathopod 1. *Paranamixis jiigurru* differs from *P. fijiensis* in its wider telson, its smooth gnathopod 2 basis and propodus palm, its bare pereopods 5–7 basis posterior margins and its coxa 2 angle. The head angle and the gnathopod 2 dactylus setation pattern are similar to *Paranamixis clarkae* Thomas, 1997, but again, *P. jiigurru* differs in its smooth gnathopod 2 basis and propodus palm.

Distribution. *Australia*. Queensland: Lizard Island (current study).

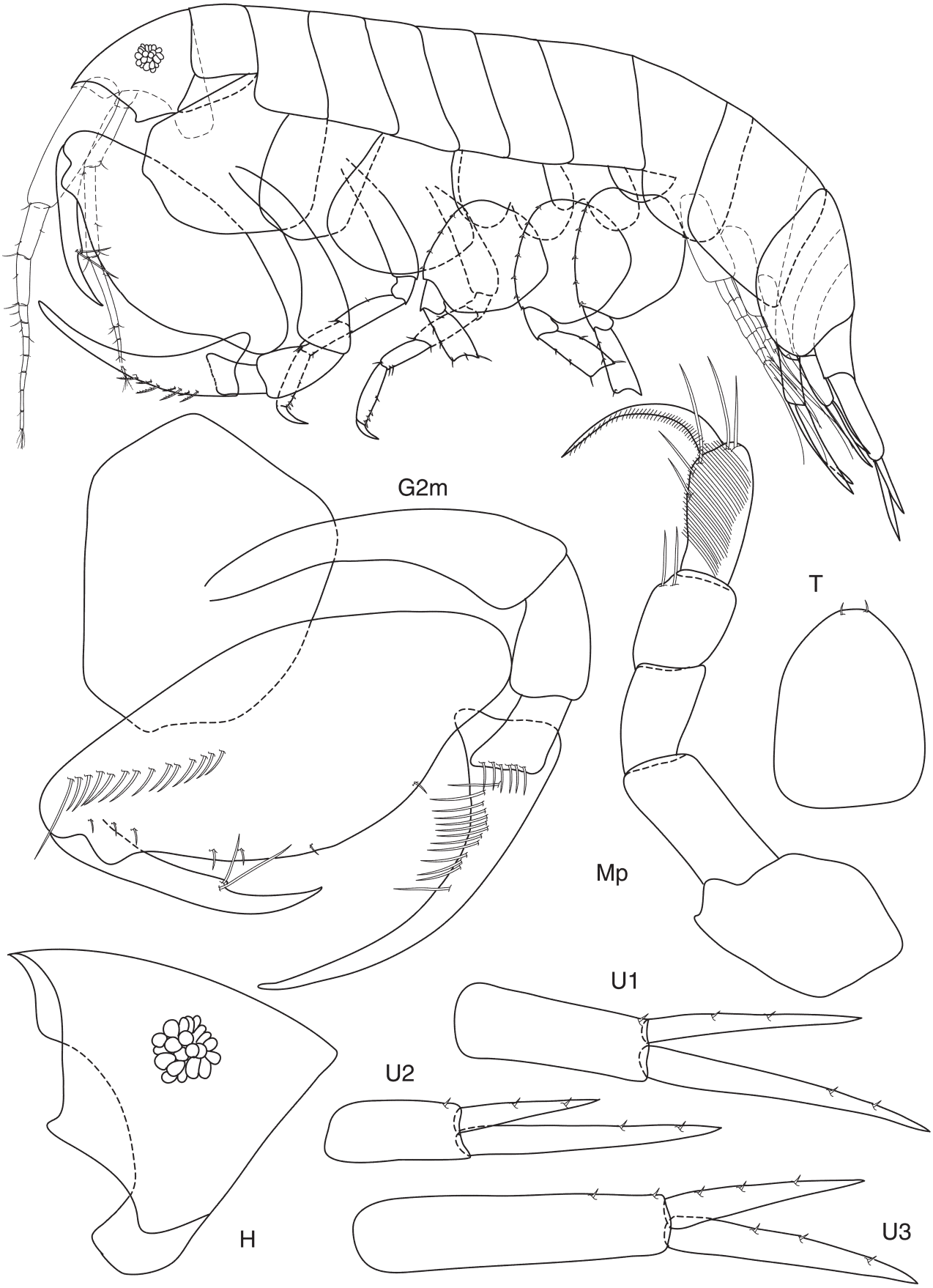

FIGURE 33. *Paranamixis jiigurru* **sp. nov.**, holotype, male, 2.7 mm, AM P79818 (SEL/LZI-2-1), Picnic Beach, Palfrey Island, Great Barrier Reef.

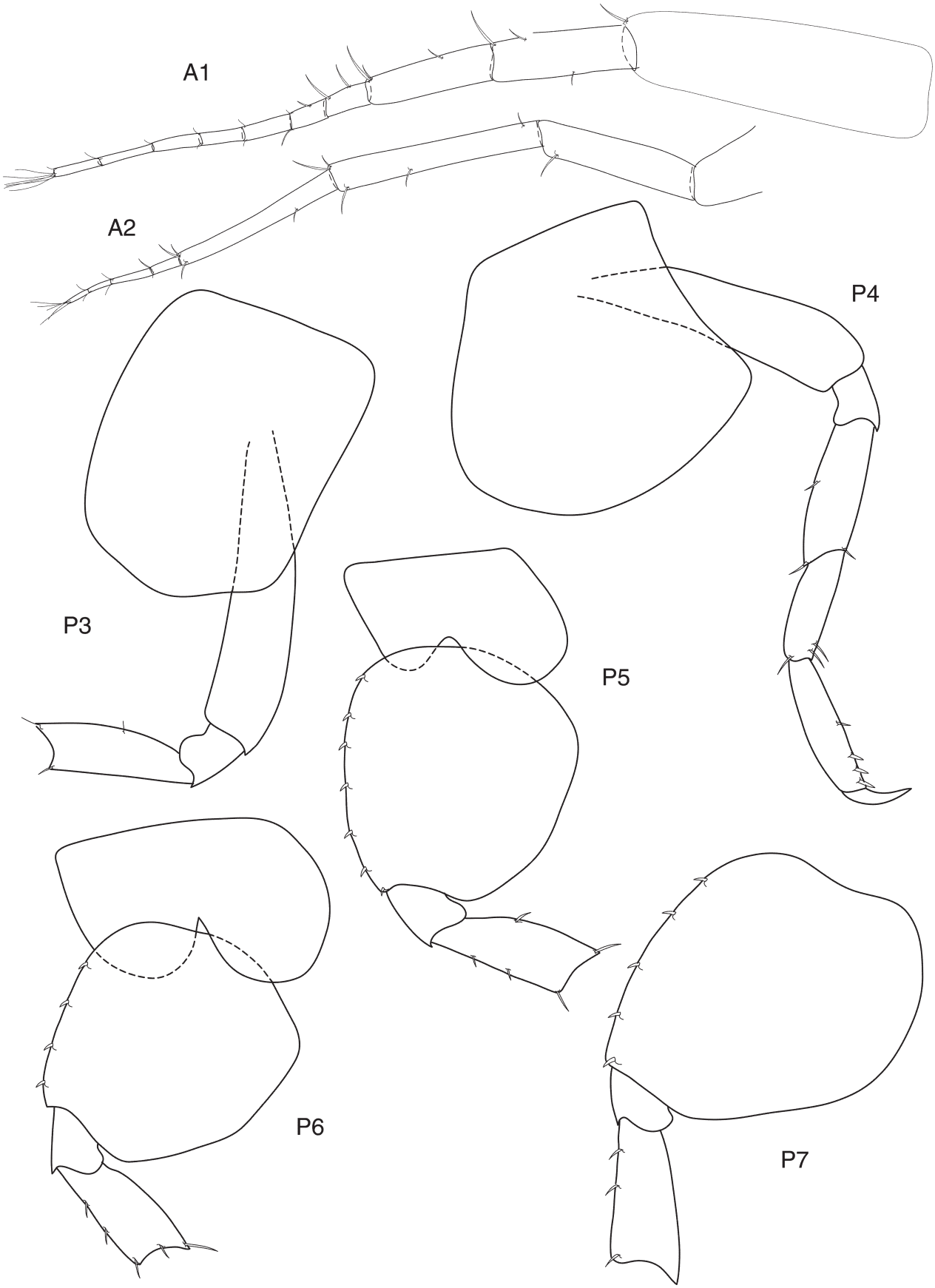

FIGURE 34. *Paranamixis jiigurru* **sp. nov.**, holotype, male, 2.7 mm, AM P79818 (SEL/LZI-2-1), Picnic Beach, Palfrey Island, Great Barrier Reef.

Unknown leucomorph
(Figs 35, 36)

Material examined. One female, 3.3 mm, AM P79285; Picnic Beach, Palfrey Island, Lizard Island (14°41.70' S 145°26.92'E), subtidal, patch reef, rubble patch with sand bottom, 2 m, S.E. LeCroy, 3 July 2001 (SEL/LZI-2-1). One female, 2.0 mm, AM P79286; Picnic Beach, Palfrey Island, Lizard Island (14°41.70'S 145°26.92'E), subtidal, protected beach, rock rubble and scattered clumps of green algae, 0.3 m, S.E. LeCroy, 4 July 2001 (SEL/LZI-2-7).

Description. Based on 2 females, 3.3 and 2.0 mm, AM P79285, AM P79286.

Head. *Head* length less than pereonite 1+2, anterior margin rounded, without serrations or teeth, anterodistal margin subquadrate with cusp, ventral cephalic keel quadrate, rostrum small to medium; eyes with 10 or more ocelli, round. *Antenna 1* 0.3 x body length; flagellum 7-articulate, peduncle width more than 2 x article 2. *Antenna 2* 0.2 x body length, shorter than antenna 1; flagellum 3-articulate. *Maxilla 1* palp 2-articulate with 3 distal setae; outer plate with 5 distal spines. *Maxilla 2* inner plate with 5 distal and 3 proximal setae; outer plate with 2 robust and 5 thin distal setae. *Maxilliped* inner plates fused, distal margin with v-shaped indentation, with short spines; outer plate reduced, reaching less than half of palp article 1, with 2 distal setae and 1 distal spine; palp 4-articulate, article 4 slender, slightly recurved.

Pereon. *Coxae 1–4* relative widths 1.0:1.5:1.0:1.6. *Gnathopod 1* coxa reduced, smooth, bare, anterodistal corner not produced, narrowly rounded, distal margin produced, posterior margin oblique; basis slightly constricted proximally, anterior and posterior margins bare; ischium bare; carpus and propodus narrow, distally attenuated; carpus length 16.7 x width, distal ornamentation forming a distal serrate blade, proximal margin smooth with 1 small seta, distal margin with 1 seta; propodus straight, palm smooth with 8 groups of 3 distal setae; dactylus smooth, reaching less than 0.1 x propodus length. *Gnathopod 2* coxa length 1.3 x width, much wider than coxa 3, smooth, setose, anterodistally rounded, distal margin oblique, posterior margin straight, facial setae absent; basis widened distally, anterior margin with 3 setae, posterior margin bare; ischium with 1 posterodistal seta; carpus 0.7 x propodus length, straight, distally tapered, anterior margin serrate, distal margin undulating; propodus posterior margin without teeth/serrations, with 1 mediofacial setal row just above midline, reaching 0.3 x propodus length, 2 rows of submarginal setae, palm triangular with 4 major projections; dactylus recurved, proximal margin smooth, anterior margin distally acute, reaching 0.6 x propodus length. *Pereopod 3* coxa length 1.7 x width, smooth, bare, anterior margin straight, distal margin straight, posterior margin straight, facial setae absent. *Pereopod* 4 coxa smooth, bare, anterior margin slightly produced, distal margin oblique, posterior margin excavate, facial setae absent. *Pereopods 5*–7 coxa facial setae absent; basis length width ratios 1.1, 1.2, 1.2, posterior margins smooth, bare.

Pleon. *Epimera 1–3* bare. *Epimeron 3* posteroventral corner broadly rounded. *Uropods 1–3* relative lengths 1.0:0.8:1.3; inner and outer ramus with robust setae. *Uropod 1+2* peduncle 0.7 x inner ramus length. *Uropod 1* outer ramus 0.5 x inner ramus length. *Uropod 2* outer ramus 0.6 x inner ramus length. *Uropod 3* peduncle subequal in length with inner ramus; outer ramus 0.7 x inner ramus length. *Telson* 1.3 x longer than wide, apex entire.

Habitat. In coral rubble from a subtidal patch reef.

Remarks. Specimens of this unknown leucomorph species were present in collections of both *A. bazimut* and *P. jiigurru* **sp. nov.** It is likely that it is the leucomorph counterpart to one of these species; however, because the specimens were collected in coral rubble, rather than directly from a sponge or ascidian host, they cannot be attributed to a particular species. Other than collecting them directly from a host, the only way to connect leucomorph and anamorph counterparts is through molecular methods.

Distribution. *Australia*. Queensland: Lizard Island (current study).

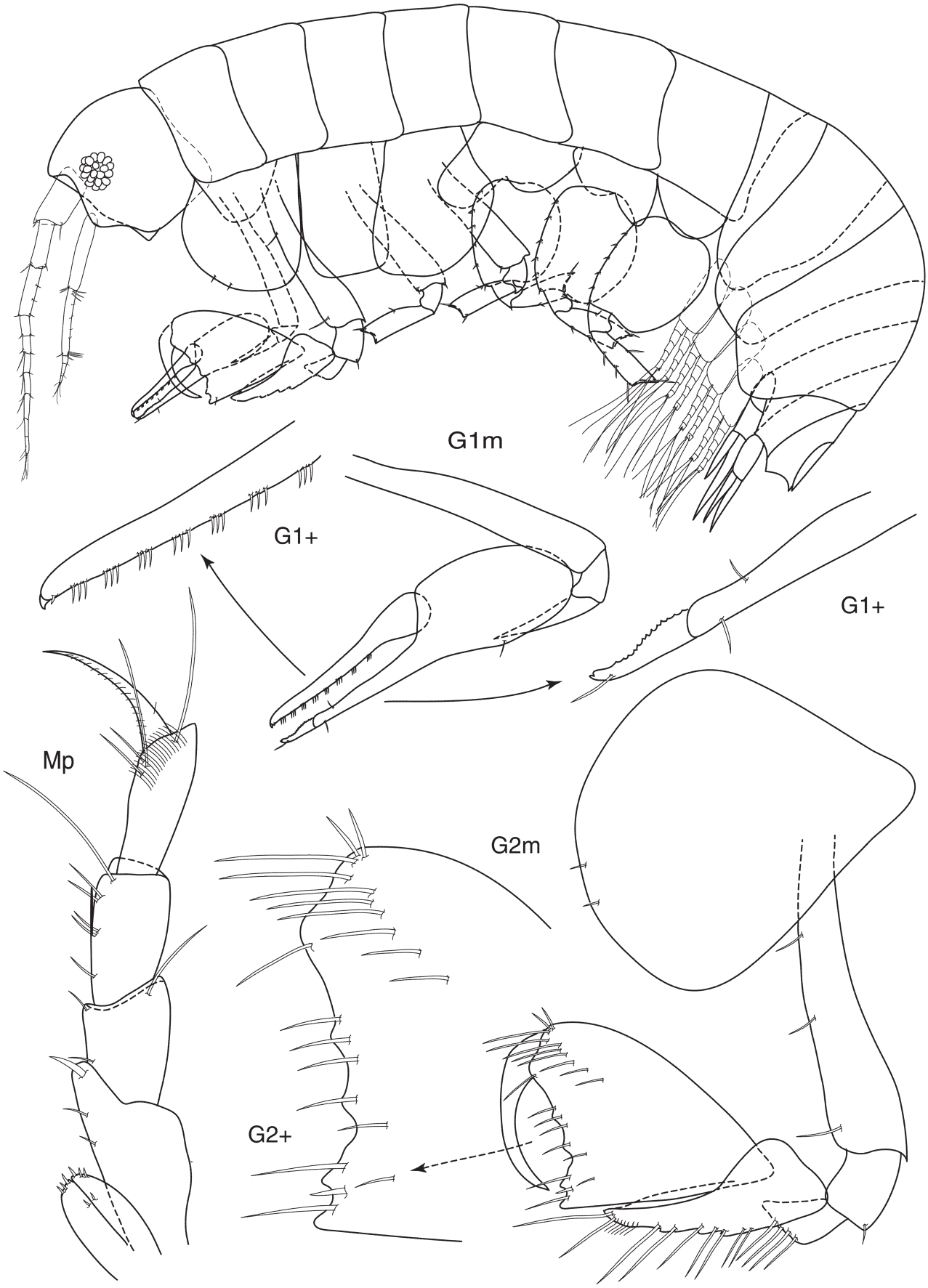

FIGURE 35. *Unknown leucomorph*, female, 3.3 mm, AM P79285 (SEL/LZI-2-1), Picnic Beach, Palfrey Island, Great Barrier Reef.

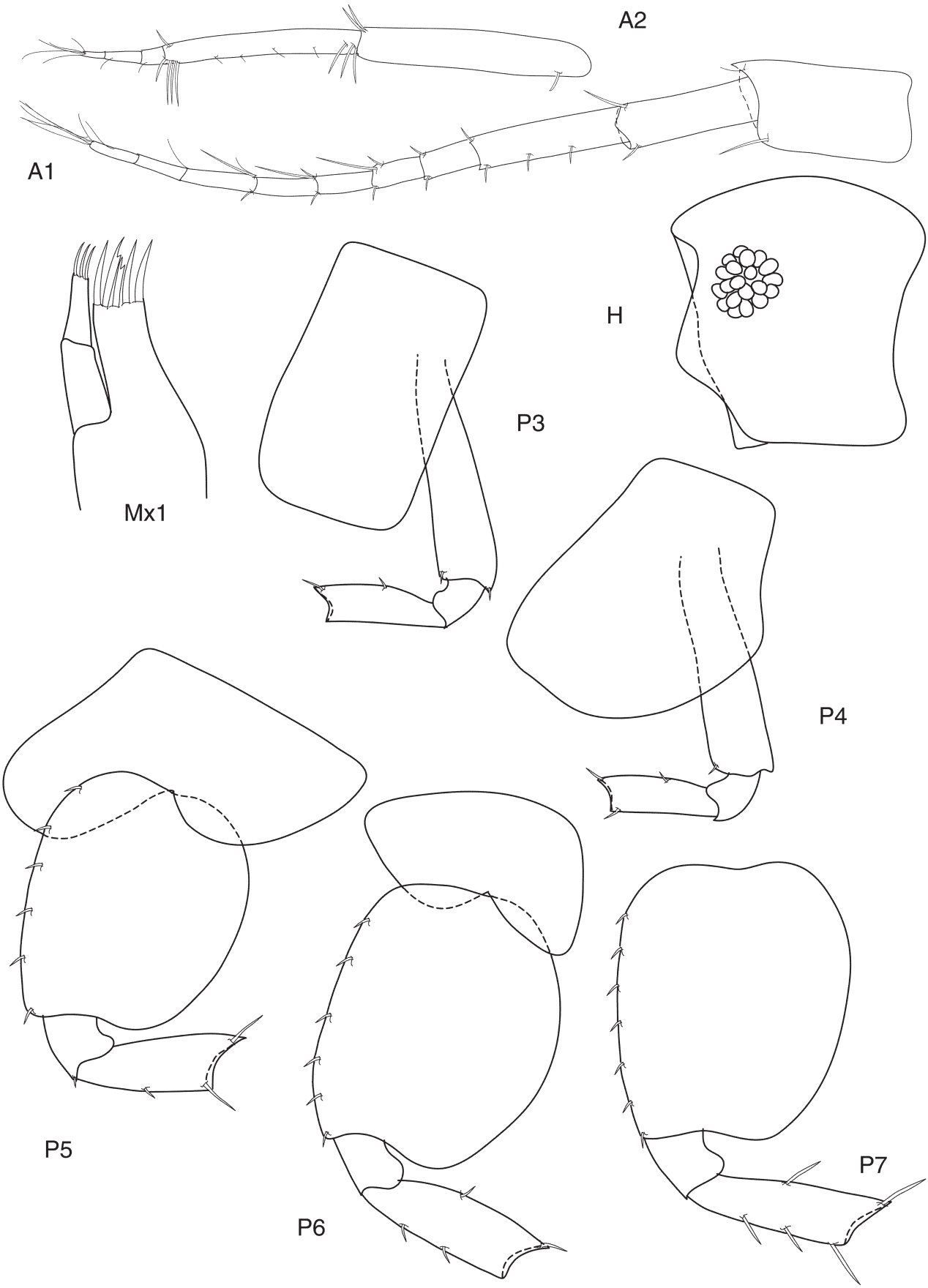

FIGURE 36. *Unknown leucomorph*, female, 3.3 mm, AM P79825 (SEL/LZI-2-1), Picnic Beach, Palfrey Island, Great Barrier Reef.

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